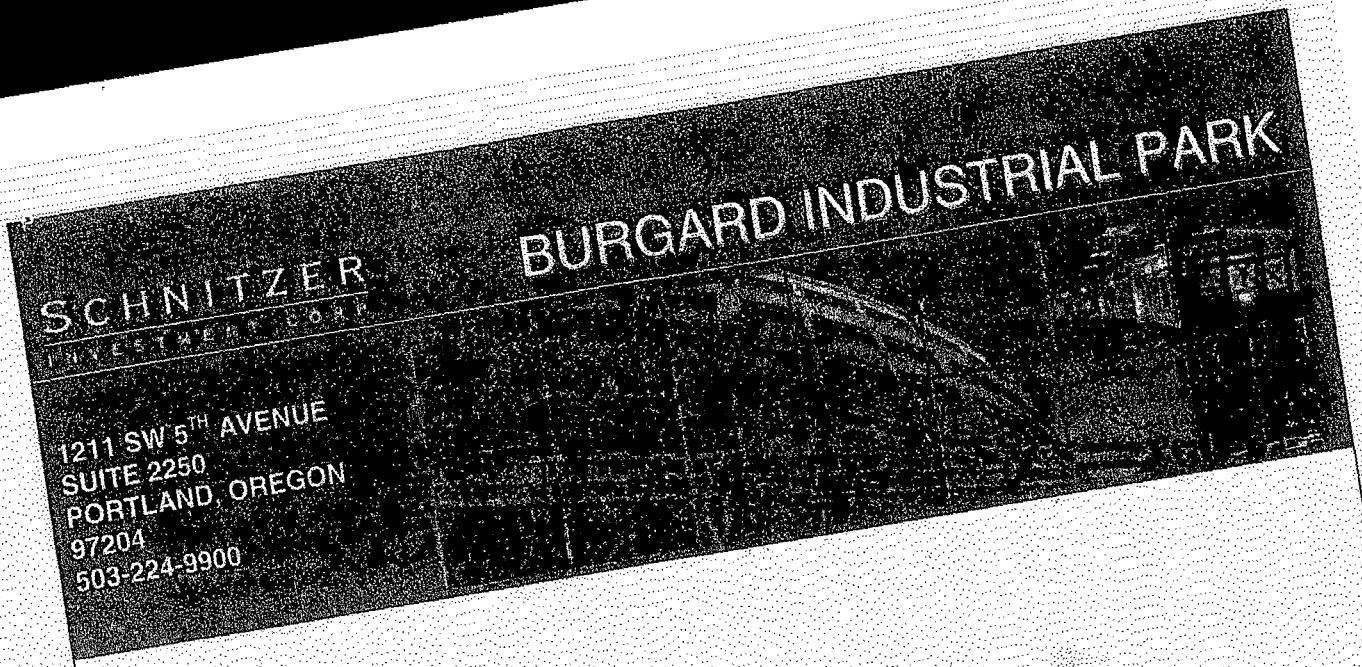

1211 SW 5TH AVENUE
SUITE 2250
PORTLAND, OREGON
97204
503-224-9900

Stormwater Management Plan

Prepared By

FLOYD | SNIDER

Two Union Square
601 Union Street
Suite 600
Seattle, WA 98101

December 2005

DISCLAIMER

Schnitzer Investment Corp. ("SIC") has assembled this information to assist a prospective buyer of the property with the buyer's analysis of the condition of the property. This information has been compiled by an experienced consultant hired by SIC and SIC considers the information reliable. However, this information is no substitute for a buyer's thorough and diligent investigation of the property. SIC will be selling the property on an as is basis, without any representations or warranties. A buyer must rely on the buyer's own study of the property, its condition, its operations, and all of the matters of significance related to the property.

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1.0 Background

1.1 INTRODUCTION

Schnitzer Investment Corp. (SIC), the owner and property manager of large portions of the Burgard Industrial Park, has voluntarily prepared this Stormwater Management Plan (Plan) to proactively manage existing and future stormwater discharges from SIC-owned property. This Plan is independent of and unrelated to stormwater plans associated with National Pollutant Discharge Elimination System (NPDES) permit requirements.

The objectives of this Plan are:

- To better understand the existing stormwater system at the Burgard Industrial Park.
- To identify how and where stormwater from individual lots and tracts within the Burgard Industrial Park commingles with other lots and tracts, and with stormwater originating from off-site sources.
- To identify general Best Management Practices (BMPs) that can be used to help maintain or improve stormwater quality as necessary.

1.2 PLAN STATUS

The information in this Plan is based on reviews of existing reports provided by SIC, field surveys, discussion with SIC personnel, and files obtained from the City of Portland's Bureau of Environmental Services (BES). This Plan should be updated when clarifying or additional information becomes available, or significant changes at the Burgard Industrial Park have occurred.

1.3 CONTACT INFORMATION

The manager of SIC-owned properties at the Burgard Industrial Park is:

Lynda Collie, Property Manager
Schnitzer Northwest, LLC
(360) 906-7004

Questions regarding this Plan should be directed to:

Susan Davidson
Schnitzer Investment Corp.
(503) 595-8113

1.4 CURRENT PROPERTY OWNERSHIP

The Burgard Industrial Park consists of over 250 acres along the eastern shore of the Willamette River in Portland, Oregon. There are over 23 tax lots within the Burgard Industrial Park. These lots and tracts are owned by several different parties, including SIC, Schnitzer

Steel Industries (SSI), Northwest Pipe Company, Lampros Steel, and Portland Container Repair, among others.

Table 1.1 provides ownership, lessee, Standard Industry Classification Code and other information for each lot and tract in the Burgard Industrial Park. Based on a business's Standard Industry Classification Code and/or their specific industrial activity, some facilities at the Burgard Industrial Park are required to obtain coverage under a general NPDES permit (e.g., the 1200-Z) for stormwater discharges to surface waters. A facility-by-facility evaluation of whether or not an NPDES permit is required was not part of this Plan. It is the responsibility of each NPDES permittee to comply with the terms and conditions of their respective permit.

Figure 1.1 highlights SIC-owned property and indicates facilities that currently operate under a NPDES permit for stormwater discharges. Off-site public and private entities located east of the Burgard Industrial Park also discharge stormwater to the Burgard Industrial Park stormwater system; these are shown in Figure 1.1 as well.

2.0 Stormwater Drainage Basins and Features

2.1 STORMWATER SYSTEM OVERVIEW

The Burgard Industrial Park stormwater system includes a series of catch basins that collects runoff from paved lots, roadways, and roof drains. The stormwater is then conveyed through a network of underground piping to discharge to surface waters via one of 24 outfalls located along the perimeter of the deep draft International Terminals Berthing Slip (Slip). The Burgard Industrial Park stormwater system was originally installed to serve the former Oregon Shipbuilding Corporation's shipyard, which operated at the Burgard Industrial Park from 1941-1945. Since then, the stormwater system has been substantially expanded, modified, and upgraded. Conceptually, the Burgard Industrial Park is subdivided into drainage basins. A drainage basin is defined as the approximate geographic extent of the area upon which stormwater falls, is collected, and then is discharged through a particular outfall. In other words, Drainage Basin 18 encompasses the area that stormwater discharging through Outfall 18 falls upon. Importantly, stormwater drainage basins at the Burgard Industrial Park do not correspond to lot lines or property ownership and outfalls/drainage basins typically serve paved areas, as unpaved areas mostly infiltrate stormwater except during times of heavy rainfall.

Approximate outfall locations and drainage basin extents are shown on Figure 2.1. The actual outfalls are typically submerged being only exposed under rare low tidal/river flow conditions. Six outfalls (18, 19, 21, 22, 23 and 24) receive stormwater from SIC-owned properties. The remaining outfalls are not discussed in this Plan, as they are associated with the SSI scrap steel facility and are not associated with the stormwater system on properties owned by SIC.

Figure 2.1 also shows the existing stormwater collection and conveyance infrastructure, as it is currently understood. This figure has been generated from a variety of sources, and field verified in limited areas based on 2005 surveys of visible stormwater features performed by Weddle & Associates, supplemented with field observations made by Floyd|Snider. To a large extent, Figure 2.1 updates a pre-existing delineation of the storm system that was performed by Bridgewater Group, Inc. (Bridgewater 2000) as part of the Burgard Industrial Park remedial investigation process. For comparison, a figure showing the Bridgewater delineation map is included in Appendix A. The 2005 survey revealed that the presumed subsurface connections and routing shown on the Bridgewater storm system map may not be entirely accurate in all places. In areas where significant uncertainty remained regarding the actual routing and alignment of subsurface piping, the routing was left off of Figure 2.1.

Brief summaries of the active facilities within the aforementioned six drainage basins are provided in the following sections. More detailed descriptions of these facilities and associated stormwater system features are provided in Appendices B and C. Additional information regarding specific facility operations and stormwater quality sampling results, where applicable, can be acquired through review of individual facility Stormwater Pollution Control Plans (SWPCPs) and information on file with BES.

2.2 DRAINAGE BASIN 18

Drainage Basin 18, which discharges through Outfall 18, is the largest drainage basin at the Burgard Industrial Park. Drainage Basin 18 consists of all or portions of Lots 1, 18, 19, 20, 21, 22, and 23; Tract A / N. Burgard Way, N. Sever Court, N. Sever Road, N. Terminal Road. This basin also receives the greatest amount of off-site stormwater that originates at Northwest Container Services, Inc. and N. Burgard Road, a public roadway.

Lot 1 currently contains four tenants. Northwest Pipe leases the southern, undeveloped portion of Lot 1. IRC Aluminum and Stainless, Western Machine Works, and Boydstun Metal Works lease the three tilt-up buildings in the northern paved portion of Lot 1. Boydstun Metal Works is the only lessee with a NPDES permit in effect for Lot 1 stormwater (Figure 1.1). Additional details for Lot 1 are provided in Appendix B.

Lot 18 is owned by Lampros Steel, which does not have a NPDES permit for stormwater discharges. Dunkin and Bush, a painting company, owns Lots 21 and 22 and also does not have a NPDES permit.

Northwest Pipe Company owns Lots 20 and 23. Their industrial facility is located on Lot 23 and is subject to NPDES permits for stormwater and industrial process water discharges. Northwest Pipe is also evaluating stormwater quality as part of their ongoing remedial investigation process being conducted under a voluntary agreement with The Oregon Department of Environmental Quality (ODEQ). Details regarding Lot 20 are included in Appendix B.

Northwest Container Services, Inc. is located off-site and discharges stormwater from the western portion of their facility into the ditches and catch basins located along the public N. Burgard Road. This stormwater commingles with stormwater from the public roadway, which is then conveyed to the Burgard Industrial Park in three locations (Figure 2.1). Exposed corrugated metal pipes descend from the hillside on Lots 1 and 18, carrying drainage from N. Burgard Road into the stormwater conveyance pipes connected to Outfall 18.

2.3 DRAINAGE BASIN 19

Drainage Basin 19 consists of Lot 2 and portions of Tract A / N. Burgard Way and Lots 4 and 5. Lot 2 is owned by SSI and is primarily unpaved, allowing most stormwater to infiltrate. Lot 2 is covered under SSI's NPDES permit. SIC ownership in Drainage Basin 19 is limited to a share of N. Burgard Way. The multi-party ownership of Tract A / N. Burgard Way is discussed in Appendix C. During heavy rainfall, stormwater from Lots 4 and 5, which normally infiltrates, runs off into these N. Burgard Way catch basins. Refer to Appendix C for additional information regarding Drainage Basin 19.

2.4 DRAINAGE BASIN 21

Drainage Basin 21 is fairly small, consisting of approximately 3 acres in the vicinity of the water tower at the northeast corner of the head of the Slip. Portions of Lots 2 (owned by SSI), 15 (owned by Smurfit-Stone), and Tract A / N. Burgard Way (owned by multiple parties) contribute stormwater to Outfall 21. Appendix C provides additional information regarding this drainage basin and associated storm drain easements.

2.5 DRAINAGE BASIN 22

Outfall 22 discharges stormwater that originates on Lots 4, 9, and 10 of the Burgard Industrial Park. Lot 4 is occupied by Portland Container Repair, which has a NPDES permit to discharge stormwater. SIC leases Lots 7, 8, and 9 to Boydstun Metal Works, which has a NPDES permit for stormwater discharges from Lot 7 and the northerly sections of Lots 8 and 9. RoMar Transportation Systems, Inc. owns Lot 10 and does not have a NPDES permit for stormwater discharges. Only the western half of Lot 10 is paved, and the exact storm system configuration in the paved portion could not be confirmed. Additional details are available in Appendix C.

2.6 DRAINAGE BASIN 23

Drainage Basin 23 consists of Lot 11, and Lots 13 through 16. Lot 11, where Premier Edible Oils formerly operated, has undergone significant changes in recent years relative to stormwater. Former discharge locations to the Willamette River have been closed, and regrading has occurred to allow for more infiltration. Lot 11 is currently vacant and runoff from limited paved areas is assumed to discharge to the Slip via Outfall 23.

Lot 13 is essentially an access roadway currently owned by SIC. Lot 14, also owned by SIC, is partially leased to Wilbur-Ellis, which does not have a NPDES permit for stormwater discharges. Catch basins located in the northern portion of Lot 14 are connected to an on-site bioswale/retention pond, which discharges to the stormwater system during times of high rainfall.

The majority of Lot 15 contributes stormwater to Outfall 23. Lot 16, owned by SIC, consists of the vegetated bank along much of the north side of the Slip as well as a paved access roadway, parking, and loading area used by Smurfit-Stone under terms of an easement from SIC. Smurfit-Stone currently manages and monitors stormwater contributions to Outfall 23 from their facility under a NPDES permit. Refer to Appendix C for details.

2.7 DRAINAGE BASIN 24

Drainage Basin 24 is fairly small and currently consists of the western portion of the paved area of Lot 16, however pre-existing storm system mapping (Appendix A) suggests that historical connections to Outfall 24 from Lot 14 may have existed. This suggests that Drainage Basin 24 once drained stormwater that now discharges through Outfall 23. Appendix C provides additional information.

3.0 Site Controls

BMPs, preventative maintenance, and inspection procedures on the SIC-owned properties described in this Plan, as well as common roadways in the Burgard Industrial Park, are helpful in controlling stormwater pollution. It is the responsibility of facilities already governed by NPDES permits to implement appropriate site controls within the specific operational area governed by their permit. The site controls recommended in this section are similar to site controls required of permittees, but are not regulatory requirements as they are for non-permitted areas of the Burgard Industrial Park.

3.1 RECOMMENDED BEST MANAGEMENT PRACTICES

The BMPs described below are general in nature and applicable to all lots. Refer to Appendix D for specific information on each BMP.

- **Containment**—Proper storage and containment of materials with the potential to contribute pollutants to stormwater is critical. It is recommended that SIC require tenants to provide either covered storage areas or upgradient stormwater diversions (i.e., asphalt berms) when storing materials outdoors that have the potential to contribute pollutants to stormwater runoff.
- **Oil & Grease**—Many catch basins at the Burgard Industrial Park have inverts that function as oil and grease traps. In this configuration, the outlet of the catch basin is fitted with a pipe that has a 90-degree bend towards the bottom of the catch basin. The elevation of the opening of this pipe is below the invert elevation of any incoming stormwater pipes and below the discharge invert elevation. This prevents floating oils and greases from discharging out of the catch basin. Catch basins without this invert configuration should be fitted with oil adsorbents in those areas that receive heavy equipment usage and truck parking. These adsorbents should be routinely checked and replaced when no longer effective.
- **Catch Basin Cleaning**—Solids that collect in the bottom of catch basins should be vacuumed out at regular intervals to prevent obstruction of the discharge flow and discharge of this particulate matter into the downstream piping and to surface waters. Clean out intervals are generally determined on a case-by-case basis, depending upon the rate of solids accumulation within individual catch basins.
- **Erosion and Sediment Control**—Due to the mix of paved and unpaved areas near some roadways, and the heavy traffic that the industrial park receives, catch basins should be fitted with filter fabric to prevent large solids and sediments from entering the stormwater system at locations of high particulate loading. Once filter fabric is installed, regular inspection and maintenance of catch basins will be necessary to ensure proper performance of the catch basin. If a catch basin insert becomes clogged, it should be cleaned or replaced.
- **Housekeeping**—Proper housekeeping of materials, waste, drains and gutters, catch basins, street sweeping, and immediate action to contain spills is essential to maintaining a clean stormwater system. SIC should verify that their tenants

implement general housekeeping practices that will greatly reduce the potential for pollutants to enter the stormwater system. Quarterly pavement sweeping on lots and tracts and roadways owned by SIC is suggested, as is limited use of deicing agents such as salts.

3.2 SURVEY PROGRAM

Regular surveys of the stormwater system are critical to maintaining good stormwater quality. Surveys during rainfall events will more readily reveal problem areas, such as sources of oil sheens, and particulate loading, and also identify poorly functioning components of the storm system. To the extent possible, surveys should occur on all lots, including facilities subject to a NPDES permit, as these facilities have more potential to contribute pollutants to stormwater and thus need more scrutiny. These surveys will complement the City of Portland's formal annual inspections of NPDES-permitted facilities. Based on available information, the City of Portland does perform these inspections annually.

Surveys conducted under this plan should include observations of the following:

- **Visual quality of stormwater being discharged to outfalls.** Each of the six outfalls covered by this Plan (Outfalls 18, 19, 21, 22, 23, and 24) should be viewed for visual evidence of pollutant loading, such as sheen, foam, or turbidity. These visual observations can best be made when the tides and river flow expose the outfall.
- **Specific areas that could impact stormwater runoff.** At areas with higher potential to impact stormwater runoff (e.g., storage, loading, cleaning, maintenance, and fueling areas), the survey should identify that storage, covering, containment or diversion tactics are being used.
- **Stormwater control measures, structures, catch basins, and treatment facilities.** Routine inspections and maintenance of these structures are essential to proper operation and pollutant removal. Surveys should verify that absorbent pads are still functional and that catch basins, catch basin inserts, and/or filter fabric are free and clear of debris and are draining properly.

3.3 EMERGENCY RESPONSE

In the event of a spill or unlawful discharge to the stormwater system, SIC has an established relationship with a spill response contractor and will coordinate response activities. Appendix E contains a one-page contact list that can be posted and accessed in case of an emergency.

4.0 References[1]

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[1] References are for the appendices as well as the main text.

Schnitzer Investment Corp.
Burgard Industrial Park
Portland, Oregon

Stormwater Management Plan

Tables

December 2005

Table 1.1
Burgard Industrial Park Lot Ownership, Occupant Activities, and NPDES Stormwater Permit Coverage

Lot #	Lot Size (acres)[1]	Owner	Lessee/Occupant	SIC Code	Current Activity	Current NPDES Permit Holder?	Drainage Basin/ Outfall #
1	20.13	SIC	Boydstun Metal Works 9002 N. Sever Ct.	3499	Welding/Fabrication	Yes	18
			Western Machine Works 12005 N. Burgard Way	3499	Machinery	No	
			IRC Aluminum & Stainless 9038 N. Sever Ct.	Unknown	Distributor and cutter of stainless steel and aluminum plate	No	
			Northwest Pipe Company 12005 N. Burgard Way	3317	Pipe Storage	No	
2	13.03	Schnitzer Steel Industries	Schnitzer Steel Industries 12005 N. Burgard Way	5093	Ferrous Processing Facility	Yes	19,20,21
3	11.123	SIC	Sargent's Towing Pacific Car Crushing	NA	Vacant Lot/Vehicle Storage	No	NA (infiltrates)
4,5,6	11.69	Portland Container Repair	Portland Container 9449 N. Burgard Way	4213	Intermodal Container Storage and Repair	Yes	19,22
7,8,9	14.2	SIC	Boydstun Metal Works 9125 N. Time Oil Road	3715	Welding/Fabrication	Yes	22

Lot #	Lot Size (acres)[1]	Owner	Lessee/Occupant	SIC Code	Current Activity	Current NPDES Permit Holder?	Drainage Basin/ Outfall #
10	13.62	RoMar	RoMar 9333 N. Time Oil Road	4225	General Warehousing and Storage	No	22
11	11.5	SIC	None	NA	NA	No	23
12	6.04	Time Oil	Time Oil 10350 N. Time Oil Road	4226	Special Warehousing and Storage for Bulk Oil	No	Unknown
13	0.36	SIC	NA		Roadway	No	23
14	9.83	SIC	Wilbur-Ellis 9945 North Burgard Way	2077	Animal and Marine Fats and Oils (Fish Food) Loading	No	23
15	9.51	Smurfit-Stone	Smurfit-Stone 9930 N. Burgard Way	2675	Manufacturing of Cardboard Boxes	Yes	21,23
16	1.29	SIC	(partial via easement) Smurfit-Stone 9930 N. Burgard Way	2675	Manufacturing of Cardboard Boxes	Yes[2]	23,24
17	75.86	Schnitzer Steel Industries	Schnitzer Steel Industries 12005 N. Burgard	5093	Steel Making/Scrap and Waste Materials	Yes	1-17[3]
18	25.21	Lampros Steel	Lampros Steel 9040 N. Burgard Way	5051	Steel Fabrication	No	18
19	?	Portland General Electric	None	NA	NA	No	18

Lot #	Lot Size (acres)[1]	Owner	Lessee/Occupant	SIC Code	Current Activity	Current NPDES Permit Holder?	Drainage Basin/ Outfall #
20	?	Northwest Pipe	Northwest Pipe Company 12005 N. Burgard Way	3317	Office / Administration	No	18
21,22	?	Dunkin and Bush	Dunkin and Bush 12005 North Burgard St.	Unknown	Industrial paint contractor	No	18
23	25.3	Northwest Pipe	Northwest Pipe Company 12005 N. Burgard Way	3462	Iron and Steel Forgings	Yes	18
Tract A / N. Burgard Way	2.56	SIC, Portland Container, and Schnitzer Steel Industries	NA	NA	Roadway	No	18,19,21
N. Sever Court	NA	City of Portland	NA	NA	None; buried public water line	No	18
N. Sever Road	NA	City of Portland (east portion) and SIC	NA	NA	Roadway	No	18

Notes:

NA Not applicable.
NPDES National Pollutant Elimination System
1 From Weddle Surveying, 2005.
2 Smurfit-Stone's SWPCP includes the catch basins located on Lot 16.
3 Lot 17 is serviced by numerous outfalls, to which SIC-owned properties do not contribute.

Schnitzer Investment Corp.
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Portland, Oregon

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Figures

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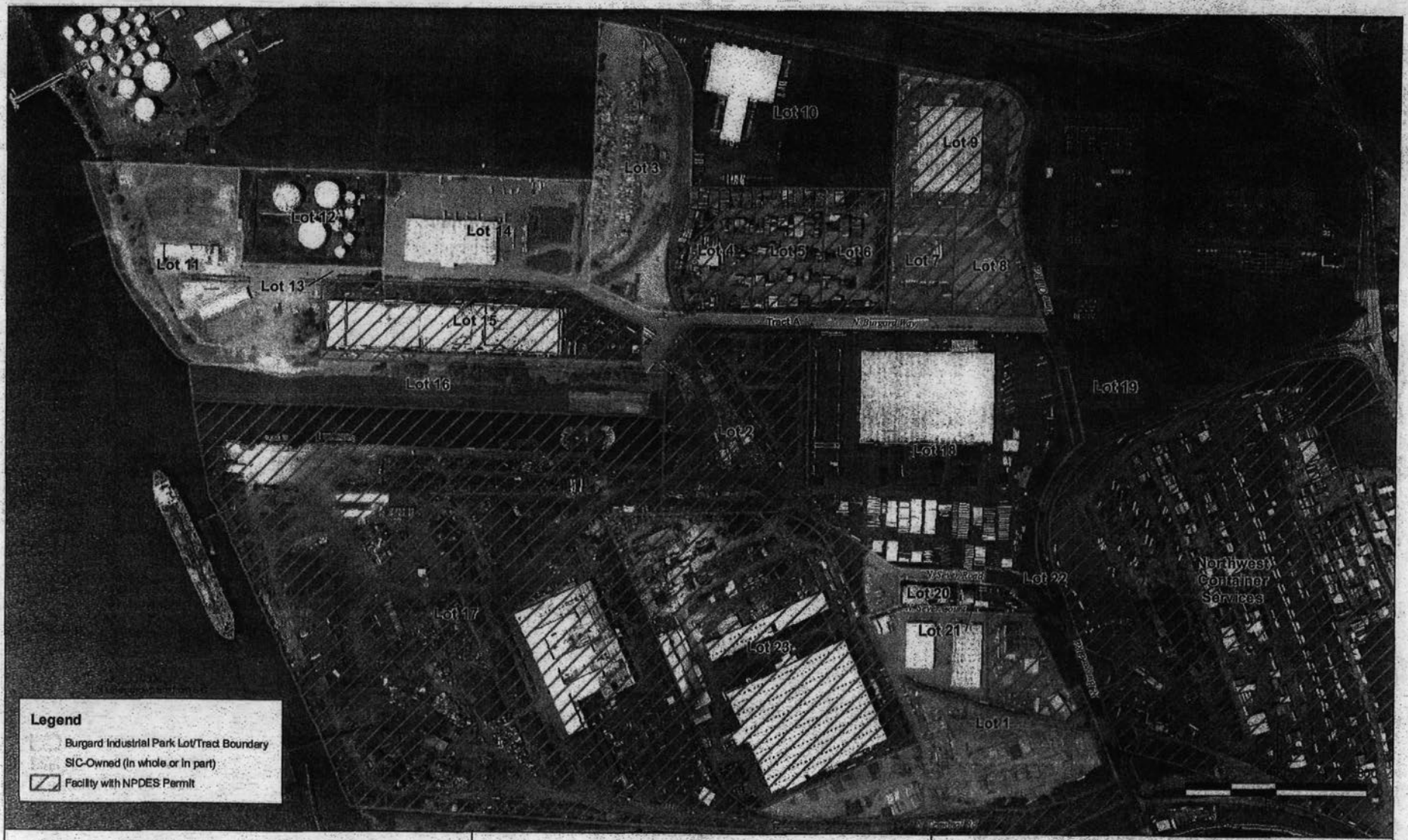

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Burgard Industrial Park
Stormwater Management Plan

Figure 1.1
Lot Ownership and NPDES Permits

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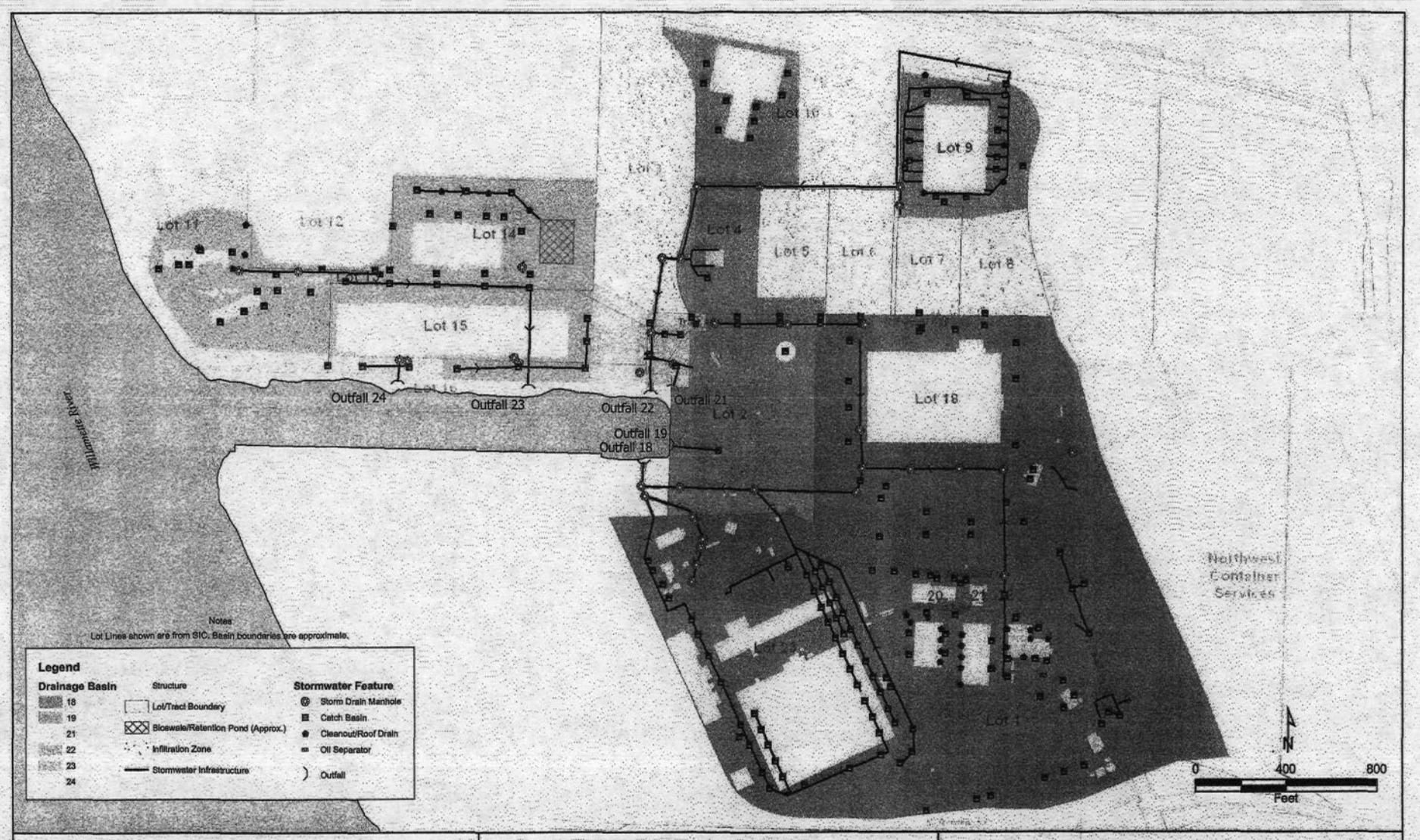

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Burgard Industrial Park
Stormwater Management Plan

Figure 2.1
Drainage Basins and Stormwater System

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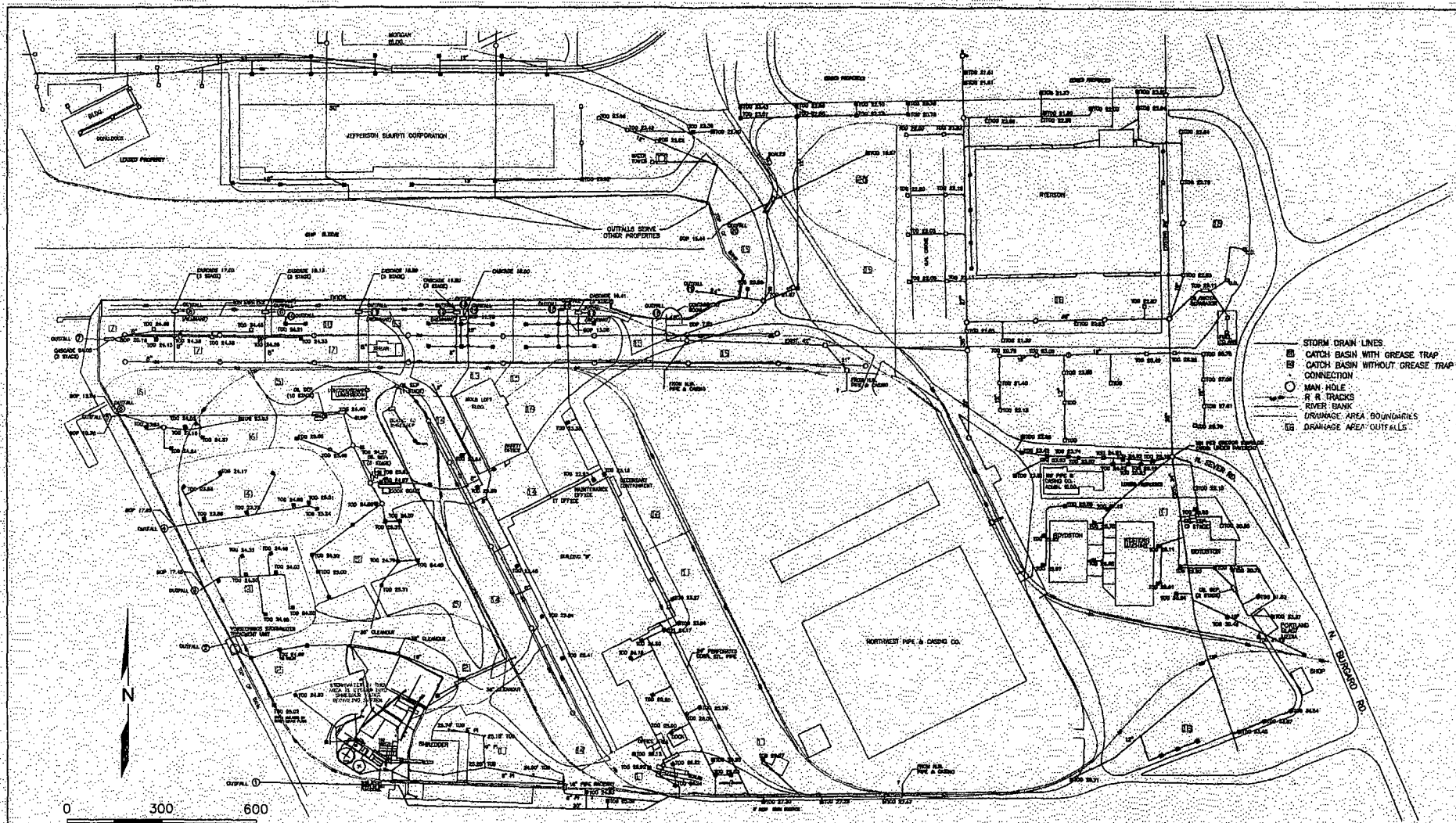
Appendix A
Historical Storm System Map

December 2005



Note: From Bridgewater Group, Inc., compiled from various sources.

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Burgard Industrial Park
Stormwater Management Plan

Appendix A
Historical Storm System Map

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Schnitzer Investment Corp.
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Appendix B
Drainage Basin 18

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Figure B.1 Drainage Basin 18

Drainage Basin 18

Drainage Basin 18, which discharges through Outfall 18, is the largest and most heavily industrialized drainage basin at the Burgard Industrial Park. Figure B.1 focuses on the Drainage Basin 18 stormwater system. The area that contributes stormwater to Outfall 18 consists of the following lots, tracts, and/or properties:

- Lot 1
- N. Sever Court
- Lots 20 and 23
- Lots 21 and 22
- N. Sever Road
- Lot 18
- Lot 19
- Tract A / N. Burgard Way
- Northwest Container (off-site property)
- N. Burgard Road (public roadway)
- N. Terminal Road

B.1 LOT 1

Stormwater runoff from the paved areas of Lot 1 is captured by numerous catch basins and conveyed in a northerly direction through a 36-inch diameter pipe, where it commingles with stormwater from other properties and eventually discharges through Outfall 18. Of approximately 23 active catch basins located in Lot 1, most are located in the paved northern portion of the lot. According to Schnitzer Investment Corp. (SIC) personnel, approximately nine catch basins are equipped with inverted outfall piping, which acts to trap oil inside the catch basin. The Lot 1 stormwater system has two oil/water separators both located in the northeast area of the lot. Roof drainage is also conveyed through the stormwater system, by direct connection from downspout to buried stormwater lines or by direct discharge to ground surface.

Lot 1 stormwater system features (i.e., catch basins and associated subsurface piping) is tied into a major 36-inch diameter conveyance pipe that traverses Lot 18, Lot 2, and Lot 17, before discharging through Outfall 18 (located on Lot 17). There are existing easements governing maintenance responsibilities with the adjacent properties owned by Schnitzer Steel Industries, Inc. (SSI) and Lampros Steel.

The eastern edge of Lot 1 slopes steeply down from N. Burgard Road. Near the southeast corner of Lot 1, a 12-inch corrugated metal pipe descends from the hillside and discharges above ground at an elevation of nearly 36 feet (refer to Figure B.1). A catch basin that is part of the Lot 1 stormwater system is located approximately 1 foot beneath this corrugated metal pipe.

The corrugated metal pipe carries stormwater from off-site sources, discussed further in Sections B.9 and B.10 (below).

The northern portion of Lot 1 includes the western extent of N. Sever Road, which is discussed in Section B.5 (below).

There are currently four tenants on Lot 1. Northwest Pipe leases the southern unpaved portion of Lot 1 for storage of pipes and equipment. Most catch basins located in the area of Lot 1 that is leased by Northwest Pipe are plugged. IRC Aluminum and Stainless, Western Machine Works, and Boydstun Metal Works lease the three tilt up buildings in the northern paved portions of Lot 1. IRC Aluminum and Stainless performs steel and aluminum plate cutting using water jet technology, and is a distributor of related products. IRC Aluminum and Stainless discharges their water jet table water to the sanitary sewer in accordance with BES discharge authorization number DABD-2005-001.

Western Machine Works' current Standard Industry Classification Code (3499-Fabricated Metal Products) only requires a National Pollutant Discharge Elimination System (NPDES) permit if stormwater is exposed to material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery. Western Machine Works has a steam cleaning wash pad equipped with a sump pump that can be activated to prevent wash pad runoff from reaching storm drains. Western Machine Works also stores equipment and materials outdoors. Western Machine Works is currently working with the City of Portland to get a No Exposure Certification (NEC), which, if obtained, exempts them from applying for a NPDES permit.

Boydstun Metal Works, a structural metal fabrication, maintenance and repair facility, leases the eastern most tilt-up building and surrounding paved area (approximately 1.5 acres) in Lot 1. Stormwater discharges from Boydstun Metal Works' facility on Lot 1 are regulated by an active 1200-Z NPDES permit (File No. 1113956). The catch basin located near the Boydstun Metal Works equipment washing pad has been intentionally blocked in order to prevent wash water from entering the stormwater system (Columbia West Engineering 2001). Boydstun Metal Works monitors stormwater in one catch basin location, shown on Figure B.1. Available monitoring results since 2002 show only two NPDES benchmark exceedances: one for Total Suspended Solids (TSS) and one for a slightly low pH (City of Portland 2005).

B.2 N. SEVER COURT

N. Sever Court is a dedicated public right-of-way owned by the City of Portland and located in the northerly portion of Lot 1. This right-of-way does not contain a roadway and is only partially paved. There is a public water line within the right-of-way (Group Mackenzie 2003). There are no catch basins located within the N. Sever Court right-of-way, however nearby catch basins are assumed to collect stormwater from the paved portions of this area.

B.3 LOTS 20 AND 23—NORTHWEST PIPE COMPANY

Lots 20 and 23 are owned and operated by Northwest Pipe Company (Northwest Pipe). Northwest Pipe manufactures potable water transmission pipe and steel pipe for various

industrial, mining, and water utility facilities. Lot 20 is used for offices/administration. Northwest Pipe's Lot 23 facility of approximately 26.3 acres discharges stormwater to surface waters under an active 1200-Z NPDES permit (File No. 6739). Approximately 90 percent of this facility is impervious (CH2MHILL 2005). Most of the impervious area drains to roughly 53 active catch basins. The Northwest Pipe stormwater system flows generally in a northerly direction and connects to the Outfall 18 conveyance pipe at two locations. A schematic layout of the active Lot 23 stormwater system is included in Figure B.1 and is based on the facility's SWPCP (CH2MHILL 2003). Although some catch basins located within the main plant building have been sealed, eleven indoor catch basins are still active (refer to Figure B.1). The northern portion of the facility, which is 26 percent impervious, does not contribute stormwater to an outfall (CH2MHILL 2005).

For NPDES compliance, Northwest Pipe currently monitors stormwater quality at two sampling ports, shown on Figure B.1, which are located near the northern property line. Based on information provided by the City of Portland, Northwest Pipe installed the sampling ports in 2001 or early 2002 (City of Portland 2002).

Northwest Pipe is undertaking a remedial investigation, under a voluntary agreement with the Oregon Department of Environmental Quality (ODEQ), to evaluate the nature and extent of soil and groundwater contamination on Lot 23. As part of the investigation, Northwest Pipe is acquiring stormwater quality data for an expanded list of analytes.

Northwest Pipe also discharges industrial process water, specifically non-contact cooling water, under the NPDES 100-J permit for industrial wastewater (CH2MHILL 2005). The non-contact cooling water is from process pump cooling in the cement plant lining and coating area. This discharge is to the Slip via the stormwater system connected to Outfall 18. The 100-J permit requires monthly monitoring for flow volume, temperature, total residual chlorine and pH. Northwest Pipe plans to replace the facilities non-contact cooling water systems with closed-loop systems in 2005, which will eliminate this industrial wastewater discharge to the stormwater system (CH2MHILL 2005).

B.4 LOTS 21 AND 22—DUNKIN AND BUSH

Dunkin and Bush owns Lots 21 and 22. Dunkin and Bush is an industrial painting contractor that performs industrial coating and lining applications, industrial painting, ceramic insulation, vacuum excavation, fireproofing, and lead abatement and other hazardous paint removal. One catch basin, which discharges via Outfall 18, is located within Lot 22. Additional catch basins that discharge via Outfall 18 are located along N. Sever Road in front of the Dunkin and Bush facility. Dunkin and Bush does not have a NPDES permit for this facility.

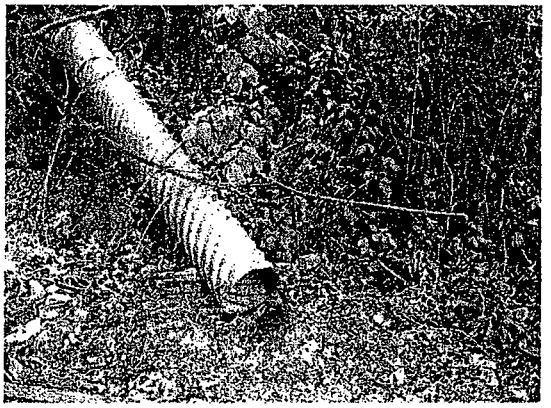
B.5 N. SEVER ROAD

N. Sever Road lies to the north of Lots 20, 21, and 22, and to the south of Lot 18. Stormwater that eventually discharges through Outfall 18 is collected in approximately 8 catch basins located in the roadway. Only the eastern portion of this roadway is publicly-owned, while the western portion is part of Lot 1. Historical maps of the former shipyard suggest that a storm system manhole is buried under the pavement of the publicly-owned portion of N. Sever Road

just north of Lot 22 (refer to Figure B.1). If it exists, this manhole is the first significant downgradient location where Lot 1 stormwater commingles and so may provide an opportunity to manage and quantify stormwater inputs from N. Sever Road, Lot 1 and off-site properties east of the Burgard Industrial Park (refer to Sections B.9 and B.10).

B.6 LOT 18—LAMPROS STEEL

Lampros Steel (formerly Ryerson) owns Lot 18. This facility has a Standard Industry Classification Code of 5051 (Metal Service Center and Distributor), which does not require an NPDES permit for stormwater discharges. Only finished steel products, such as beams, are stored outdoors. SSI leases a portion of Lot 18 for their vehicle fueling station. Fuel is stored in three modern underground storage tanks with overfill protection and leak monitoring. An oil water separator and automatic cutoff valve are installed near the tanks to prevent releases of fuel to the storm system in the event of a spill.



Catch basins on Lot 18, as well as the building's downspouts, discharge through Outfall 18. The eastern edge of Lot 18 is steeply sloped down from N. Burgard Road. As shown in Figure B.1 and the photograph at right, a pipe carrying stormwater down from the roadway protrudes from the hillside and presumably discharges onto ground surface at Lot 18. According to SIC personnel, additional flows are present, as only a small amount of water has been observed to discharge here, while significant flowing water has been heard near the pipe. There is a possibility that this pipe represents an overflow line, and that additional buried piping may be present that connects to other subsurface pipes in the vicinity. In either case, stormwater from this pipe likely discharges through Outfall 18. The origin of this off-site stormwater is identified and discussed in Sections B.9 and B.10.

B.7 LOT 19—PORTLAND GENERAL ELECTRIC

Lot 19 is located east of Lot 18 and is owned by Portland General Electric. It primarily consists of a portion of Time Oil Road. There are no catch basins associated with this piece of roadway, although grading indicates that surface runoff sheet flows onto the steep slope located along the eastern edge of Lot 18.

B.8 TRACT A / N. BURGARD WAY

Tract A, or N. Burgard Way, is currently jointly owned by SIC, Portland Container and SSI, and provides access to multiple lots within the Burgard Industrial Park. N. Burgard Way is subject to the terms of an easement declaration (Tract A Declaration), which dictates ownership, use, utility easements, management responsibilities, and cost sharing for repairs and maintenance. Lots 2, 3, 4 and 5 are "ownership lots", allowing that 25 percent common interest in Tract A be

deeded to each of the four ownership lots. A "managing owner" is designated as the owner of Lot 3 and is responsible for administration of the roadway's repair and maintenance. These responsibilities include regular inspection and maintenance of the stormwater system so that it is in proper operating condition.

The alignment of buried piping that connects catch basins located along the straight portion of N. Burgard Way is unclear. Stormwater from the eastern portion of N. Burgard Way is collected and conveyed to the subsurface piping that discharges via Outfall 18. Pre-existing storm system mapping by Bridgewater, however, suggest some catch basins drain through Outfall 19 (refer to Appendix A).

B.9 NORTHWEST CONTAINER SERVICES, INC.

The western portion of the Northwest Container Services, Inc. property is included in Drainage Basin 18 because three culverts discharge facility stormwater onto N. Burgard Road, which, in turn, discharges to Outfall 18 after commingling with stormwater originating from Burgard Industrial Park lots. Northwest Container Services provides containerized rail transportation, storage, handling, repair and maintenance of sea-going containers and container chassis (Northwest Container Services Inc. 2001). This property, formerly owned by Union Carbide, is located east of Lot 1 across N. Burgard Road. The facility is associated with a significant volume of container truck traffic.

A portion of stormwater from Northwest Container is discharged to the Columbia Slough (located north of the property) and a portion to the Willamette River (via Outfall 18). Northwest Container holds a 1200-COLS NPDES permit for discharges to the Columbia Slough (File No. 109793/A). According to the facility's SWPCP, at one time, Northwest Container monitored 1200-Z NPDES permit parameters in one location near their office building and the southern property line. This location received discharge from a stormwater treatment pond that services runoff from the office parking lot (Northwest Container Services Inc. 2001).

A former railroad ravine lies in the south of Northwest Container's facility. From 1998 to 1999, Northwest Container filled this ravine under permit in order to match their facility grade. Stormwater drainage associated with this fill area flows onto Lot 1 under the N. Burgard Road railroad bridge (Burgard Bridge). According to conversations with the City of Portland, plans to replace the Burgard Bridge involve maintaining existing drainage patterns, including surface runoff and piped drainage from the former railroad ravine.

Three stormwater discharge points from Northwest Container are visible along the eastern shoulder of North Burgard Road. Each discharge point is an open-ended pipe co-located with City of Portland roadway catch basins (refer to Figure B.1). The means by which Northwest Container's stormwater reaches Outfall 18 is discussed in the next section (Section B.10).

B.10 N. BURGARD ROAD

N. Burgard Road is a public roadway located along the eastern boundary of the Burgard Industrial Park. This roadway separates the Burgard Industrial Park from Northwest Container Services. Stormwater runoff from this stretch of N. Burgard Road is collected in catch basins or

ditches and culverts, and discharged in at least three locations to the Outfall 18 stormwater system (refer to Figure B.1).

The northernmost relevant stormwater collection feature of N. Burgard Road consists of a buried 12-inch corrugated metal pipe that traverses the roadway, as shown on Figure B.1. Stormwater is collected in a roadside ditch that drains to this pipe. One of Northwest Container's discharge points is to this ditch and associated pipe. This pipe can be seen protruding from the hillside on the eastern edge of Lot 18 (refer to Section B.6).

The second set of relevant N. Burgard Road storm drain features consists of three relatively new City-installed catch basins connected in series (refer to Figure B.1). Stormwater entering these catch basins flows southward to the intersection of N. Burgard Road and N. Sever Road, where a buried pipe conveys the water northwesterly, apparently following the N. Sever Road right-of-way onto the Burgard Industrial Park. This pipe may connect to a historically documented manhole under N. Sever Road in front of Lot 22 (discussed in Section B.5). As illustrated in the photograph at right, the middle catch basin in this system is co-located with one of Northwest Container's discharge points (refer to Figure B.1).

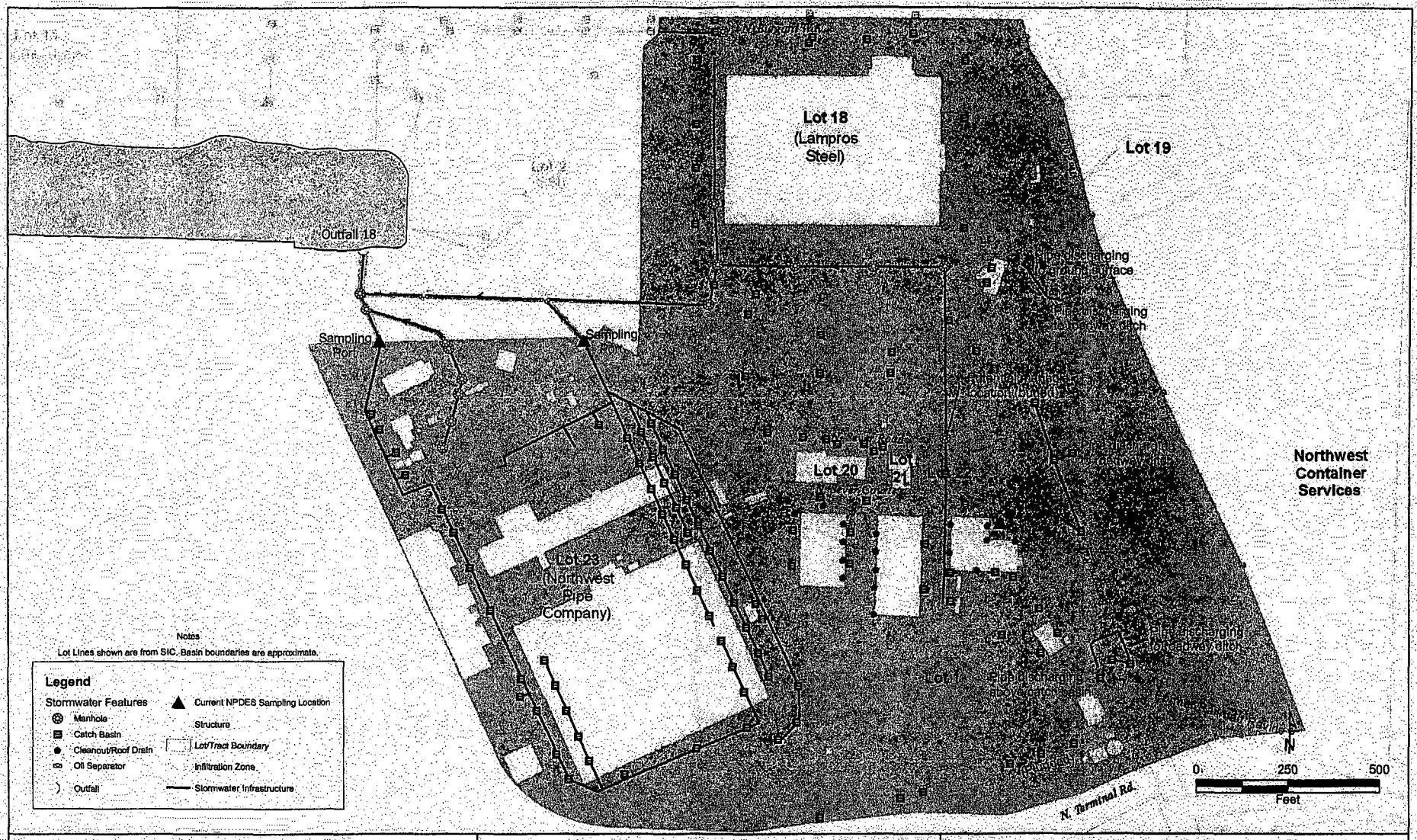
The southernmost roadway stormwater collection features consist of two catch basins connected by buried 8-inch steel pipes. Water in these pipes is conveyed to the 12-inch corrugated metal pipe that discharges onto Lot 1, as discussed in Section B.1. These catch basins collect water discharged to the roadway from the Northwest Container property, N. Burgard Road and the Burgard Bridge.

In addition to providing roadway runoff from these point sources, N. Burgard Road may also contribute stormwater in the form of sheet flows onto Lot 1 due to the grade difference between the roadway and the significantly lower Burgard Industrial Park.

B.11 N. TERMINAL ROAD

The privately-owned N. Terminal Road is located along the southern boundary of Lot 1 and serves as an access road to Lot 17. Stormwater that falls on the eastern section of this roadway may flow onto the southern part of Lot 1. Catch basins on Lot 1 in this area, however, are plugged. Current stormwater contributions from N. Terminal Road to Outfall 18 are therefore considered insignificant.

Appendix B
Figures



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Schnitzer Investment Corp.
Burgard Industrial Park
Stormwater Management Plan

Figure B.1
Drainage Basin 18

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Schnitzer Investment Corp.
Burgard Industrial Park
Portland, Oregon

Stormwater Management Plan

Appendix C
Northern Drainage Basins

December 2005

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Figure C.1 Northern Drainage Basins

Northern Drainage Basins

This appendix discusses the Burgard Industrial Park's northern drainage basins: 19, 21, 22, 23, and 24. Refer to Figure C.1 for northern basin delineations and associated storm system features.

C.1 DRAINAGE BASIN 19

Drainage Basin 19 is relatively small, consisting primarily of Lot 2. Schnitzer Investment Corp. (SIC) ownership in Drainage Basin 19 is limited to N. Burgard Way. Historical storm system maps suggest that catch basins in N. Burgard Way in front of Lots 4 and 5 may drain through Outfall 19 (Appendix A). Drainage Basin 19 consists of the following lots, tracts and properties:

- Lot 2
- Tract A / N. Burgard Way
- Lots 4 and 5

C.1.1 Lot 2—Schnitzer Steel Industries

In 2005, Schnitzer Steel Industries (SSI) purchased Lot 2 from SIC. Most of the property in Lot 2 is unpaved, comprising open ground, rail lines, and roadways. A portion of Lot 2 is used for open storage of inert materials (i.e., piping and steel). The unpaved open ground absorbs most precipitation. A catch basin is located near the head of the Slip that collects stormwater from Lot 2 for discharge to Outfall 19. Lot 2 is covered under SSI's National Pollutant Discharge Elimination System (NPDES) permit.

C.1.2 Tract A / N. Burgard Way

The multi-party ownership of Tract A / N. Burgard Way is discussed in Appendix B, Section B.8. Historical storm system mapping (refer to Appendix A) suggests that catch basins located along the western straightaway portion of N. Burgard Way discharge through Outfall 19.

C.1.3 Lots 4 and 5—Portland Container Repair

Portland Container Repair Corporation owns Lots 4, 5 and 6, a total of 11.69 acres. Stormwater discharges from Portland Container Repair Corporation are regulated by a 1200-Z NPDES permit. Current activities include container loading and unloading, trailer and container storage, metal grinding, welding, painting, container washing, vehicle/equipment maintenance and refueling, and refrigeration unit repair and replacement.

Most of the ground at Lots 4 and 5 is covered by a gravel-like slag. Precipitation ponds on the ground surface and either evaporates or infiltrates into underlying soils. There is an infiltration trench along the western boundary of Lot 4 (Century West 2001). During heavy rainfall, some stormwater from the southern portion of Lot 4 and from Lot 5 may surface flow down a short

slope and into catch basins located on N. Burgard Way that, based on historical storm system maps, drain to Outfall 19.

Based on available information, the northern and central portion of Portland Container's Lot 4 contributes stormwater to Outfall 22. Refer to Drainage Basin 22 (Section C.3) for additional information.

C.2 DRAINAGE BASIN 21

Based on historical maps (Appendix A) and storm drain easements, Drainage Basin 21 consists of a small area of land in the vicinity of the water tower at the northeast corner of the head of the Slip (refer to Figure C.1). Approximately seven catch basins are observable in this area, although the exact location of buried pipes that connect these catch basins has not been field-verified. The following lots, tracts and properties are partially included in Drainage Basin 21:

- Lot 2
- Tract A / N. Burgard Way
- Lot 15

C.2.1 Lot 2—Schnitzer Steel Industries

Lot 2 activities and ownership are discussed in C.1.1. One catch basin located in the northwest corner of Lot 2 in the vicinity of the water tower is connected to Outfall 21, and Outfall 21 itself is located on Lot 2. As part of the Tract A Declaration, storm drain easements provide for perpetual use of Lot 2's buried storm lines and Outfall 21 by the ownership lots (refer to Appendix B, Section B.8).

C.2.2 Tract A / N. Burgard Way

The westernmost portion of Tract A / N. Burgard Way splits to provide access to Lots 11 - 16. This area is subject to the multi-party ownership declaration discussed in Appendix B, Section B.8; as well as to storm drain easements associated with stormwater pipes that traverse Lot 2 and discharge through Outfall 21.

C.2.3 Lot 15—Smurfit-Stone

Lot 15 is owned and operated by Smurfit-Stone, which produces corrugated cardboard and packaging material. Stormwater discharges from the site are regulated by a 1200-Z NPDES permit. Historical storm system maps and Smurfit-Stone's SWPCP suggest that four catch basins located in the easternmost portion of Lot 15 discharge stormwater through Outfall 21. However, catch basins in this area could not be field verified. Additional information regarding Smurfit-Stone is presented in Section C.4.5.

C.3 DRAINAGE BASIN 22

Outfall 22 discharges stormwater that originates on the northerly lots of the Burgard Industrial Park.

- Lot 4
- Lot 9
- Lot 10

C.3.1 Lot 4—Portland Container Repair

Activities conducted by Portland Container Repair Corporation on Lots 4, 5, and 6 are described in Section C.1.3. The northern and central portion of Lot 4 is located within Drainage Basin 22. Stormwater that ponds in the central western portion of Lot 4 overflows into a manhole (Century West 2001) that is inline with the stormwater conveyance piping associated with Outfall 22. Additionally, stormwater from most of the repair area in Lot 4 drains to a catch basin (Century West 2001) that also eventually discharges via Outfall 22. Portland Container Repair Corporation historically sampled stormwater at this catch basin for compliance with their 1200-Z NPDES permit. As of 2003, stormwater is sampled at the manhole (as shown on Figure C.1). Based on available storm system mapping, stormwater quality monitored in this manhole may not be solely representative of the Portland Container facility, as the manhole is in-line with the stormwater conveyance from Lots 9 and 10.

C.3.2 Lot 9—Boydstun Metal Works

Boydstun Metal Works leases Lots 7, 8 and 9 from SIC. This facility performs structural metal fabrication, primarily producing commercial vehicle carrier trailers. Stormwater discharges from Boydstun Metal Works are regulated by a 1200-Z NPDES permit (File No. 111395). Lots 7 and 8 are primarily pervious and therefore do not contribute significant stormwater to an outfall. Stormwater from Lot 9, which is mostly paved, discharges via Outfall 22. Approximately nine catch basins located around the perimeter of the main warehouse, and warehouse roof drains, collect stormwater from Lot 9 (Columbia West Engineering Inc. 2001). This stormwater is routed to a pump station at the northeast corner of Lot 9 where Boydstun Metal Works collects stormwater samples in accordance with the 1200-Z NPDES permit (refer to Figure C.1). Stormwater is conveyed to a manhole connected to the conveyance piping associated with Outfall 22.

C.3.3 Lot 10—RoMar Transportation Systems

RoMar Transportation Systems, Inc. owns Lot 10. This facility has a Standard Industry Classification Code of 4225 (General Warehousing and Storage), which does not require an NPDES permit for stormwater discharges. The eastern half of the property is unpaved. It is likely that the paved portion of this property, which was developed in recent years, drains to the same major conveyance line as Lot 9 (refer to Figure C.1), and that it contributes stormwater to Outfall 22, however system configuration could not be confirmed.

C.4 DRAINAGE BASIN 23

Drainage Basin 23 may be the second largest drainage basin at the Burgard Industrial Park. Because the alignment of buried stormwater piping is not well understood in this area, the definition of the extent of this drainage basin is also the most uncertain. For the purposes of this Plan, a judgment has been made regarding the extent of this drainage area. Drainage Basin 23 consists of portions of each of the following lots:

- Lot 11
- Lot 12 (unconfirmed discharge)
- Lot 13
- Lot 14
- Lot 15
- Lot 16

C.4.1 Lot 11

Lot 11 was leased to Premier Edible Oils in 1999. Prior to this, stormwater runoff from unpaved portions of Lot 11 was directed via collection sumps and pipes to two outfalls located along the bank of the Willamette River. In 1999, SIC permanently closed off valves at the outfalls in order to preclude further stormwater discharges to the Willamette River. SIC also regraded portions of the property to allow the diverted stormwater to be more readily adsorbed by on-site soils. Therefore, a large portion of Lot 11 does not contribute stormwater to an outfall; stormwater is instead allowed to infiltrate.

Runoff from the limited existing paved areas of Lot 11 is collected in catch basins and potentially conveyed to discharge to the Slip via Outfall 23.

C.4.2 Lot 12

Lot 12 is owned by Time Oil. The facility at Lot 12 is considered inactive and is not covered under an NPDES permit. Any stormwater contributions from Lot 12 to Slip outfalls have not been confirmed.

C.4.3 Lot 13

Lot 13 is a small piece of SIC-owned land located between Lots 12 and 15. It is used as an access road and could be considered an extension of Tract A / N. Burgard Way. There are four catch basins, located along either side of the roadway, which likely discharge through Outfall 23.

C.4.4 Lot 14

Lot 14 is partially leased to Wilbur-Ellis, which is located in the western side of the Lot 14 building. The other half of the building is currently vacant. Wilbur-Ellis specializes in dry-bulk

transloading, bagging, and shrink-wrapping of bulk and palletized feed and food (Wilbur-Ellis 2005). This facility has a Standard Industry Classification Code of 2077 (Animal and Marine Fats and Oils Loading Facility), which does not require an NPDES permit for stormwater discharges.

In the northern portion of Lot 14, approximately eight catch basins (seven with inverted outflow pipes) convey stormwater to an on-site bioswale/retention pond, which was added in recent years when additional pavement was placed on the lot. At times of high flow, the bioswale discharges stormwater to subsurface piping. This piping runs to the south where, based on historical storm system maps, it picks up stormwater from additional catch basins located along the rail line at the southern boundary of Lot 14 and northern boundary of Lot 15. After traveling through Lots 15 and 16, discharges from this piping are through Outfall 23, located on the north side of the Slip.

C.4.5 Lot 15—Smurfit-Stone

Lot 15 is owned by Smurfit-Stone. A series of catch basins located along the northern boundary of Lot 15, as well as catch basins located east of the warehouse, collect stormwater and discharge through Outfall 23. Smurfit-Stone has historically sampled stormwater quality in this drainage basin. Initially, stormwater samples were collected from a manhole on Lot 16 located just upstream of Outfall 23. Correspondence obtained from City of Portland files, dating from late 2001, indicates that the sampling location was changed when Smurfit-Stone "discovered that the stormwater pipes leading to the outfalls on our property originate from adjacent properties" (Smurfit-Stone 2001). The two catch basins where Lot 15 stormwater is currently sampled are shown on Figure C.1.

C.4.6 Lot 16

Lot 16 consists of the vegetated bank along much of the north side of the Slip as well as a paved access roadway, parking and loading area used by the Smurfit-Stone. Smurfit-Stone has an easement from SIC for their use of the paved portion of Lot 16. There are 3 catch basins located along the central portion of Lot 16 that are connected to the stormwater piping that discharges to Outfall 23. As discussed above and shown in Figure C.1, Smurfit-Stone currently monitors stormwater from the easternmost catch basin in this area that discharges through Outfall 23. The terms of Smurfit-Stone's easement from SIC for use of this area do not specify responsibilities for maintaining stormwater infrastructure on Lot 16. Because Smurfit-Stone monitors stormwater at a catch basin within Lot 16, it is assumed that they also perform routine maintenance activities.

C.5 DRAINAGE BASIN 24

Based on available information, the current extent of Drainage Basin 24 is very small. Historical connections to Outfall 24 from Lot 14 and adjacent properties may have existed, suggesting that Drainage Basin 24 was once larger. However, available information indicates that current stormwater contributions to Outfall 24 are from only a portion of one lot.

- Lot 16

C.5.1 Lot 16

There are three catch basins located along the western half of Lot 16 that are connected to the stormwater piping that discharges to Outfall 24. These catch basins are located within the area over which Smurfit-Stone has an easement from SIC. Discharge from these catch basins is not monitored under the Smurfit-Stone NPDES permit (Section C.4.6).

Appendix C
Figures

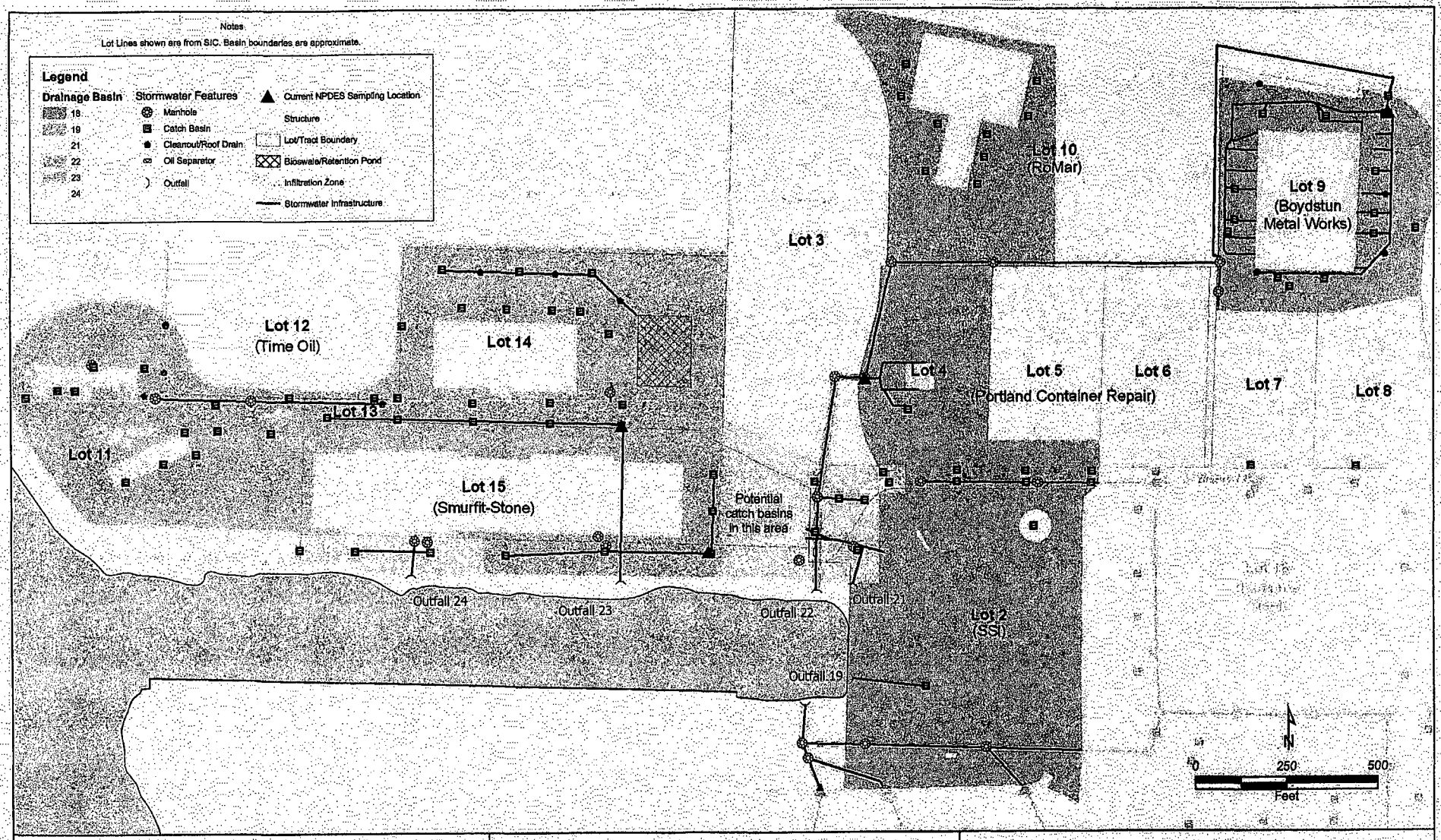

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Figure C.1
Northern Drainage Basins

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Schnitzer Investment Corp.
Burgard Industrial Park
Portland, Oregon

Stormwater Management Plan

Appendix D
Best Management Practices

December 2005

STATE OF OREGON
DEPARTMENT OF ENVIRONMENTAL QUALITY

RECOMMENDED BEST MANAGEMENT PRACTICES FOR STORM WATER DISCHARGES

Guidance for Eliminating or Reducing
Pollutants in Storm Water Discharges
Associated With Industrial Activity

August 1997

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RECOMMENDED BEST MANAGEMENT PRACTICES FOR STORM WATER DISCHARGES

1 INTRODUCTION

Best Management Practices (BMPs) are instrumental in developing the management portion of the Storm Water Pollution Control Plan (SWPCP) required by the National Pollutant Discharge Elimination System (NPDES) General Storm Water Discharge Permits.

BMPs are measures or controls that reduce pollutants at the source to prevent the pollution of storm water runoff discharged from the site. These practices can also be used to divert runoff away from areas of exposure to pollutants, such as raw materials, intermediate products, or finished products. In addition, BMPs can be used to direct polluted runoff to natural or other types of treatment. The storm water discharge permits do not require specific BMPs because the practices should be selected on a case-by-case basis depending on the particular activities ongoing at the industrial facility and other factors. These factors might include the quantity of rainfall reaching the site, the area of land available for constructing management practices, costs in implementing the practices, etc.

In selecting a BMP for the facility's storm water program, the permittee should choose "source reduction" practices as much as practicable. These are practices that reduce the amount of pollution that is generated at the site and prevent contaminants from being exposed to storm water in the first place. If this is not possible, practices that recycle or reuse the runoff on the site should be considered. Treating contaminated storm water to remove pollutants before the runoff leaves the site is the next option, although this may transfer the pollution problem from one place or medium to another since treatment will not be completely effective. Source reduction methods are the most desirable BMPs because they keep storm water away from pollutants and are frequently less costly than treatment alternatives.

There a variety of treatment mechanisms available for treating storm water. Many of the references mentioned in the appendix contain a description of storm water treatment facilities. It should be noted that treatment mechanisms are not a substitute for the BMPs mentioned in this document. Storm water treatment menchanisms should be considered in instances where source reduction BMPs are not sufficient.

2 STORM WATER BEST MANAGEMENT PRACTICES BY ACTIVITY

The BMPs included in this guidance document are related to source reduction and treatment methods for specific processes and activities ongoing at the industrial site. The permittee should consider the recommended practices in developing and/or revising their Storm Water Pollution Control Plan if these activities are ongoing at the facility. In addition, the preventive measures mentioned may assist the facility in achieving storm water discharge benchmarks and limitations through pollution prevention.

All of the BMPs recommended in this guidance are intended to complement, not conflict with, existing state and federal regulations regarding the handling, containment, or treatment of any material or waste.

The following BMPs relate to specific activities that are common for industrial facilities:

- Outside Storage of Raw Materials, Intermediate Products, By-Products or Finished Products
- Outside Container Storage and Waste Disposal
- Loading and Unloading Liquid Materials
- Emergency Spill Response and Cleanup Plan
- Above-Ground Tank Storage
- Outside Manufacturing Activity
- Fueling Stations
- Vehicle and Equipment Washing
- Vehicle and Equipment Maintenance
- Sandblasting and Painting Operations
- Inspection and Monitoring Activities
- Dust Control
- Erosion Control
- Treatment Alternatives

2.1 Outside Storage of Raw Materials, Intermediate Products, By-Products, or Finished Products

This BMP applies to facilities that store or stockpile raw or finished materials or products used in manufacturing or processing on their site. Materials frequently stockpiled may include sand, gravel, topsoil, wood chips, sawdust, compost, lumber and building products, or metal products.

The permittee should select from among the following practices that would be appropriate for the type of material stored outdoors and exposed to storm water runoff:

1. Build a covered area with a paved floor for storing materials to prevent contact with storm water runoff. This practice could be used for significant materials that may seriously contaminate storm water runoff (and ultimately surface water bodies) should contact occur. While this practice may prove expensive, the permittee could weigh the costs of constructing the storage area versus treating the contaminated runoff, or consider the other practices. *See Figure 2.1.A.*

2. Place a temporary plastic film or sheeting over the material. If small quantities of materials are stored outdoors, it may be economical to cover them in this manner. *See Figure 2.1.A.*

3. For new storage areas on the site containing significant materials, pave the area where the material will be stored and install a drainage system to collect the storm water runoff.

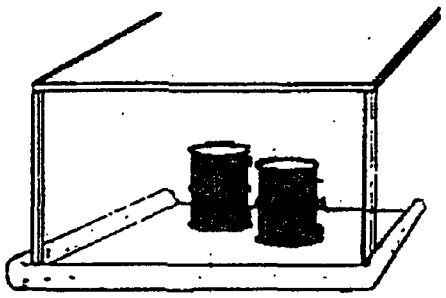
The paved area should be sloped to minimize the pooling of water on the site, particularly with materials that could leach pollutants into the storm water. Curbing should be placed along the perimeter of the area to prevent contaminated runoff from leaving the site. The drainage system should minimize the use of catch basins in the interior of the paved area since the catch basins could fill with the stored material and clog.

The drain from the paved area can be connected to the sanitary sewer if allowed by the local public works department. If this is not possible, then the runoff may need treatment to remove pollutants using a process appropriate for the nature of the contaminants. If a wastewater treatment system is located on the site, this system may be capable of treating the contaminated runoff. The Department's approval would be required for connection of contaminated storm water to the facility's system.

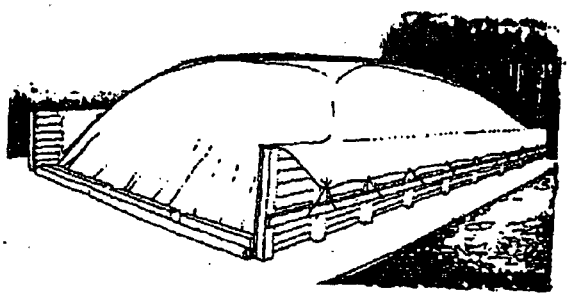
4. For existing unpaved areas on the site with large quantities of materials stockpiled, determine whether or not the rainfall infiltrates, or passes into, the grass cover and/or soil through visual observations during rainfall events. If the runoff passes into the soil, no further work is needed **provided** there is no contamination of groundwater sources resulting from the infiltration of the runoff.

If the quantity of storm water falling on the storage area is greater than the soil can absorb during the storm event, construct a berm around the storage area to both collect and divert the excess runoff either to the sanitary sewer or for treatment, as noted above in Practice 3.

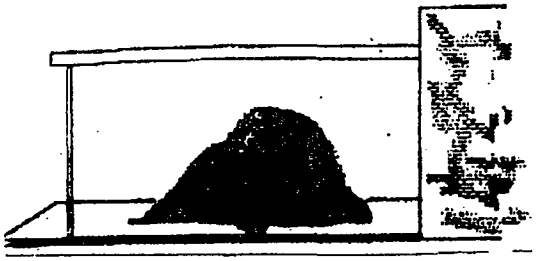
5. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).



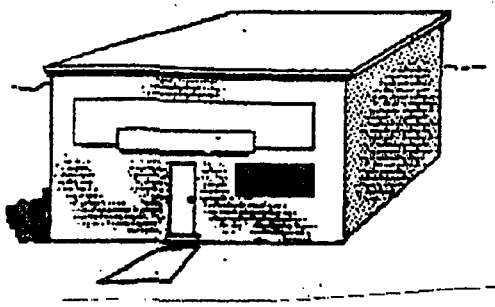
Small Chemical Storage Area
with Curbing and Cover



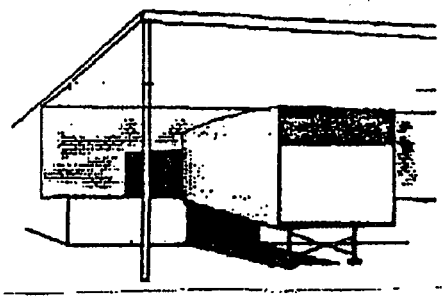
Raw Material Storage Covered
with Tarpaulin



Covered Area for Raw Materials



Enclosed Area for Storage of
Raw Material or Chemicals



Covered Area for Loading and
Unloading

Figure 2.1.A: Outside Storage Details
(Modified from U.S. Environmental Protection Agency, Storm Water Management for Industrial Activities, September 1992)

2.2 Outside Container Storage and Waste Disposal

This BMP refers to containers located outdoors and used to temporarily store materials, such as accumulated food wastes, paints, oils, vegetable or animal grease, solvents, and waste materials (e.g., used batteries.)

If the industrial facility has container storage of materials in an outdoor location, the following practices are recommended to prevent contact between the container and storm water runoff:

1. Designate the location of the container area on the site and install a paved floor with bermed or curbed sides within this area to contain and keep spills of materials and contaminated storm water runoff from leaving the bermed area.

The berm or curb should be of adequate height to contain an amount equal to the volume of the largest single storage tank, plus additional volume to account for potential rainfall accumulation. A good approximation of the needed volume would be 110% of the largest storage tank, but additional volume may be needed depending on the quantity of rainfall reaching the site. Slope the paving on the floor of the designated area to a lined sump that will prevent the transfer of spilled liquids and/or contaminated runoff to surface water or groundwater.

2. If at all possible, cover the designated area for container storage or bring the containers indoors to prevent contact with rainfall.

If the entire area cannot be covered, it is important to cover containment bins, tanks, or hoppers to prevent rainfall from entering the container and percolating through the stored materials. Waste liquids should be covered with tarpaulins or roofed structures. The covers should be large enough to keep rainfall out of the containment berm surrounding the stored liquids.

3. Segregate and securely store incompatible or reactive materials in separate containment areas in order to prevent the mixing of chemicals should spills occur.

4. For containers that are mounted for direct removal of a liquid chemical by employees, install a paved, bermed, and covered area as described above in Practices 1 and 2. Allow 110% of the container size, or some higher approximation, for the containment volume. A drip pan should be placed under the mounted container for use during transfers of the liquid. *See Figure 2.2.A*

5. Install overfill protection on storage tanks and drums to minimize the risk of spilling liquids during transfer and loading. Install guards around tanks and piping to prevent damage from forklifts or vehicles.

6. Secure the designated storage area to prevent unauthorized persons from accessing storage containers and causing spills. Examples of such measures include using a locked storage building to house the containers, or using a locking system for drum lids. Also provide warning signs, such as: AUTHORIZED PERSONNEL ONLY, DANGER - HAZARDOUS MATERIALS, FLAMMABLE MATERIALS, TOXIC MATERIALS, etc.

7. Inspect all containers at least monthly for deterioration to make sure leakage of the substance is not occurring. This is crucial to prevent contamination of storm water runoff that will come in contact with containers that are not covered. Also inspect the lids of drums or containers to ensure that they are in place and properly

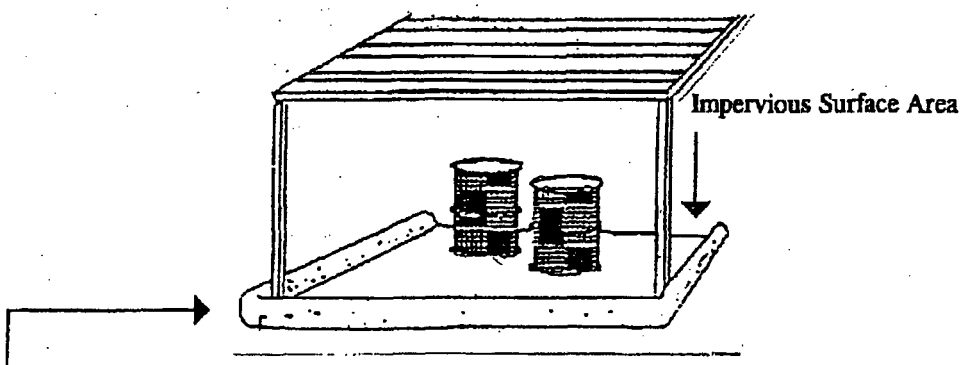
secured. A drum that contains materials with a specific gravity less than water may fill with rainfall from the bottom of the drum and allow the stored material to leak or spill out the top.

It may also be helpful to obtain a storm sewer map from the local public works department to identify potential surface water discharge points on and around the site and their location in relation to containers or the storage area if spills should occur.

8. If the material stored is a hazardous waste, the permittee shall comply with any additional DEQ or federal regulations and requirements not mentioned in this guidance.

9. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

Covered Storage Area With Berm



Mounted Container with Drip Pan

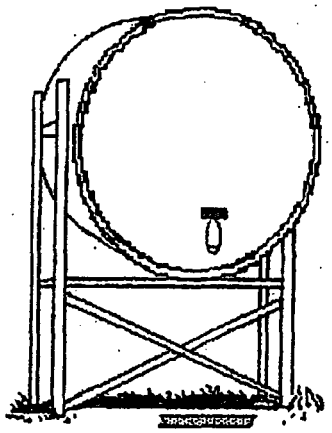


Figure 2.2.A: Container Storage
(Modified from Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February, 1992.)

2.3 Loading And Unloading Materials

This BMP applies for both the loading or unloading of materials stored in containers and direct liquid or gas transfers from tanks. The loading or unloading of materials should take place in the facility's operations building so that both spills and the residual materials resulting from the cleanup can be discharged to the sanitary sewer or the process wastewater treatment system.

If the transfer of materials occurs outdoors, the facility should consider the following practices to prevent the contamination of storm water runoff from spilled materials:

1. With truck transfer of materials, use loading docks with overhangs or door skirts to enclose the end of the trailer. The loading/unloading area should be designed to prevent storm water runoff from entering the transfer area with curbing or berming. The permittee should have the appropriate materials available for rapid cleanup of spills. *See Figure 2.3.A.*

2. For tanker truck transfer to above-ground or underground storage tanks, pave and slope the floor of the transfer area to a sump or a secondary containment system to prevent leakage from spills.

The paving material used needs to be suitable for the type of liquid that is transferred. For example, gasoline should not be transferred over an asphalt surface because gas will react with and slowly dissolve the asphalt. In this case, a Portland cement concrete surface should be used.

3. Place drip pans as needed when making and breaking connections for the transfer, and under hose connections, hose reels, and filler nozzles. *See Figure 2.3.A*

With the rail transfer of materials to above-ground or underground storage tanks, use drip pans at locations where spills may occur, as noted above in Practice 2. A drip pan system should be installed within the rails to collect spills from tank cars.

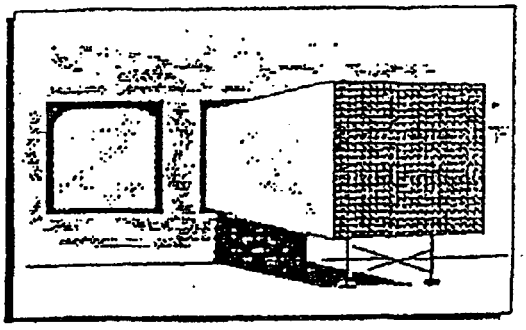
4. Follow Coast Guard Requirements found in 33 Code of Federal Rules (CFR) Titles 153, 154, and 155 for transfers to and from marine vessels. These regulations cover spill response, spill prevention at marine transfer facilities, and spill prevention for vessels. Technical requirements are specified for loading arms, transfer hoses, closure and monitoring devices, and small discharge containment. In addition, the regulations also require an operations plan and specify its general contents as follows: description of the responsibilities of personnel, nature of the facility, hours of operation, sizes and numbers of vessels using the facility, nature of the cargo, procedures if spills occur, petroleum transfer procedures, and a description and location of equipment for monitoring, containment, and fire fighting.

5. Examine loading/unloading areas for dust or fumes or stains to determine if materials are being lost during these operations. Check vehicles and equipment frequently for leaks and repair them promptly. Clean up any leaks to the ground appropriately.

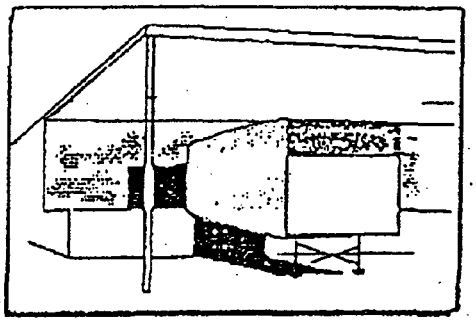
It may also be helpful to obtain a storm sewer map from the local public works department to identify potential surface water discharge points on and around the site and their location in relation to containers or the storage area if spills should occur.

6. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

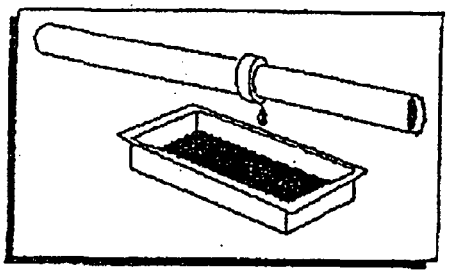
Dock with Door Skirt



Dock with overhang



Drip Pan



Drip Pan within Rails

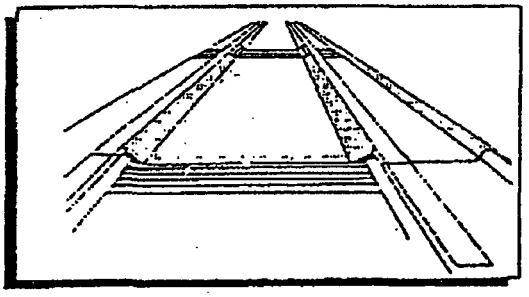


Figure 2.3.A: Loading and Unloading Liquid Materials
(From City of Seattle, WA, Water Quality Best Management Practices Manual for Commercial and Industrial Businesses, June 30, 1989.)

2.4 Emergency Spill Response And Cleanup Plans

Every facility should maintain an appropriate **Emergency Spill Response and Cleanup Plan** for all material handling activities on the site. Areas where spilled materials can impact storm water runoff and their associated drainage points should be clearly identified. Methods to prevent spills along with cleanup and notification procedures should be identified in the plan and made available to appropriate personnel. The required cleanup equipment must be on site or readily available. An employee trained in spill containment and cleanup should be present during loading and unloading of materials.

In addition, owners of certain non-transportation related facilities must prepare a Spill Prevention Control and Countermeasure Plan. These facilities include those involved in storing, processing, or refining oil and oil products which have above-ground storage capacity in excess of 1,320 gallons or a single container in excess of 660 gallons, or have underground storage capacity in excess of 42,000 gallons, or due to location could reasonably expect spilled oil to reach waters of the United States or adjoining shorelines. Please see 40 Code of Federal Regulations (CFR) Part 112 or call EPA at 1-800-424-4EPA for more information about this requirement.

The NPDES storm water discharge permits also require that spill prevention and response procedures for any significant material present at the site be described in the facility's storm water pollution control plan. In addition Oregon Administrative Rule (OAR) 340-108, *Oil and Hazardous Material Spills and Releases*, further specifies spill reporting requirements, cleanup standards and liabilities for an actual or threatened spill or release involving oil or hazardous material.

The DEQ, EPA and U.S. Coast Guard all require that spill contingency plans be prepare for oil transferring and storage facilities according to the specific requirements set forth in their rules. DEQ rules may be found in OAR 340-47, *Regulations Pertaining to Oil Spills Into Public Waters*. The EPA requirements may be found in 40 CFR Part 112. In response to the Oil Pollution Act of 1990, EPA recently proposed amendments to 40 CFR Part 112 which may be found in Federal Register Volume 58, No. 30, February 17, 1993. The U.S. Coast Guard's interim rules may be found in Federal Register Volume 58, No. 23, February 5, 1993. Although the requirements from each agency are somewhat similar there are differences in planning volumes for worst case spills, initial response times, and recovery standards. For more information please contact the Department of Environmental Quality.

The following guidelines are recommended in preparing a Spill Prevention Control and Countermeasure Plan and are also useful when preparing the section of the storm water pollution control plan that addresses spills:

1. Describe the facility, provide the owner's name and address, describe the nature of the activities at the facility, and indicate the general types of chemicals used on the site.

2. Provide a site plan showing the location of chemical storage areas, the location of storm drains, the direction of the slope of the site toward the drains, and the location and description of any structures or devices on the site, such as control valves or lined sumps, to prevent spills from leaving the site.

3. Provide notification procedures that will be used in the event of a spill for contacting key personnel and local and state government agencies.

4. Provide detailed instructions regarding cleanup procedures, including how to handle fires and explosions should they occur.

5. List the designated person with overall spill response cleanup responsibility.

6. Describe the training program that will be implemented for key personnel. All employees at the facility should have basic knowledge of spill control procedures.

7. Provide a summary of the spill cleanup plan that will be posted at appropriate points throughout the work place. The summary should identify the spill cleanup coordinators, the location of cleanup kits, and phone numbers of regulatory agencies to be contacted in the event of a spill.

8. If a spill occurs, cleanup should begin **immediately**. No emulsifier or dispersant shall be used. If the spill could reach sanitary or storm sewers or surface waters, local and state government officials should be notified **immediately**.

9. Provide information about the cleanup kit(s) located at the site. The contents of the kit should be appropriate for the type and quantities of chemicals stored at the facility. The kit may contain the following: lined drums, absorbent pads, and granular or powdered materials for neutralizing acids or alkaline liquids. The kits should be located in a manner that allows easy access and use by employees, and drills should be practiced to ensure quick and effective response.

2.5 Above-Ground Tank Storage

These best management practices are recommended for tank storage systems that many facilities maintain on their sites. The following practices should complement any special requirements for these systems, such as any additional restrictions imposed by the Fire Marshall's Office.

1. Install an overfill protection on the storage tank to minimize the risk of spilling liquids during transfer and loading. Install guards around the tanks and piping to prevent damage from forklifts or vehicles.

2. For permanently installed tank storage systems, use curbing or diking to contain spills and leaks. The curbing should be of adequate height to contain a volume equal to the volume of the largest single storage tank plus rainfall, if the storage area is uncovered. A good approximation of the needed volume would be 110% of the largest storage tank, but additional volume may be needed depending on the quantity of rainfall reaching the site.

The floor area enclosed by the curbing needs to be covered with an impervious surface and sealed to prevent spills from contaminating groundwater. The paved floor should also be sloped to a lined sump for collection of small spills. Weekly cleaning of the sump is needed to minimize the contamination of storm water. *See Figure 2.5.A.*

3. If no contaminants are present, collect and remove or discharge accumulated rainfall from the curbed area frequently during the wet season.

4. Install and maintain an oil/water separator for treating storm water that is discharged from a petroleum tank farm for removal of contaminants.

5. Train employees in operating procedures, and label valves and piping to reduce human error.

6. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

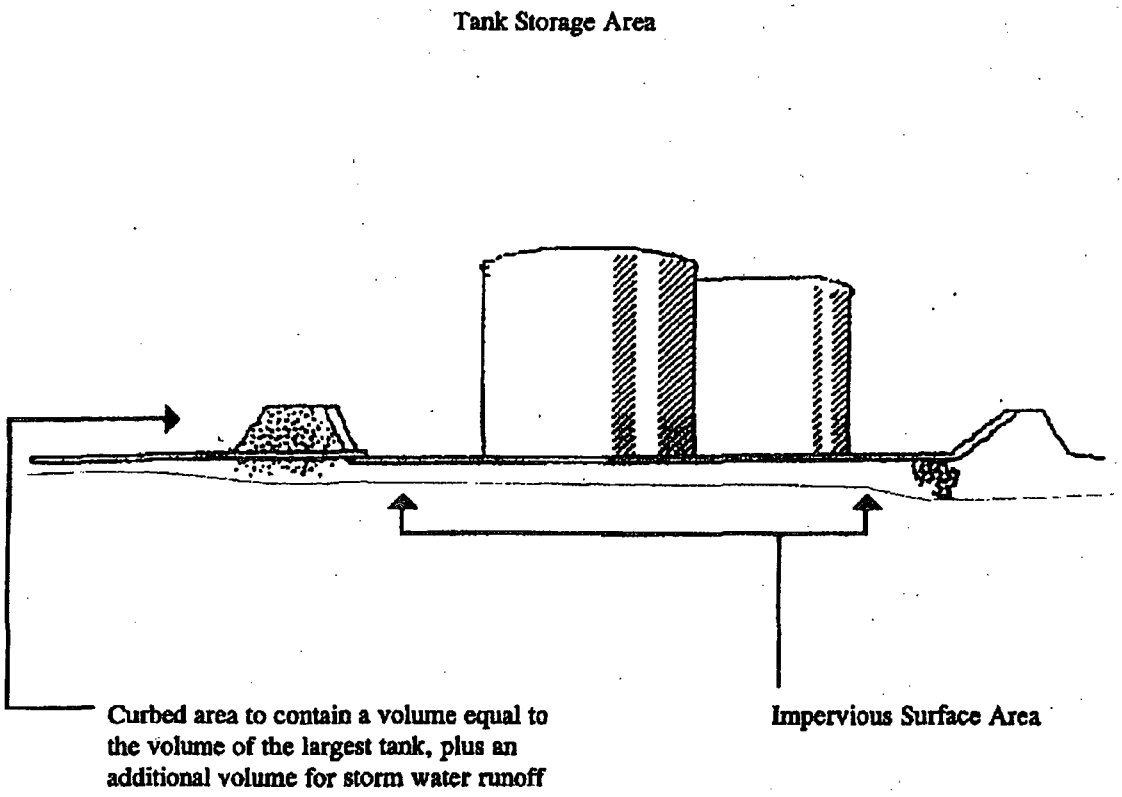


Figure 2.5.A: Tank Storage System
(Modified from City of Seattle, WA, Water Quality Best Management Practices for Commercial and Industrial Businesses, June 30, 1989)

2.6 Outside Manufacturing Activity

Some industrial facilities may carry out manufacturing activities in outdoor areas and produce pollutants that will contaminate storm water runoff. Particularly serious activities that occur outdoors and produce contaminants include rock grinding or crushing, parts grinding or sanding, painting or coating, degreasing or parts cleaning, or operations using hazardous materials.

The following practices are recommended to prevent contamination of storm water from such activities:

1. Alter or change the activity so that pollutants are not discharged.

2. Enclose the activity, if practical and cost-effective or bring it indoors. If the manufacturing activity is enclosed within a structure, floor drains can be installed to transport wastewaters to the sanitary sewer system if allowed by the local public works department. Contact with storm water would be prevented.

3. Cover the activity. If enclosing the manufacturing activity within a structure is too costly, construct a cover over the site (without walls). Floor drains can be installed to carry wastewaters to the sanitary sewer system if allowed by the local public works department. Berms or dikes would need to be constructed around the floor of the activity area to retain rainfall that is carried into this area by wind. If contained on the floor, the contaminated storm water would then be discharged to the sanitary sewer for treatment.

In addition, waste piles can be covered temporarily with reinforced tarpaulins, polyethylene, polyurethane, Hypalon or polypropylene to prevent contamination of runoff.

4. Segregate the activity. If parts of the manufacturing process are the worst source of pollutants, these parts can be covered or enclosed to prevent contact with storm water. Floor drains can be installed, if allowed by the local public works department, to transfer wastewaters to the sanitary sewer system.

5. Establish a waste reduction program at the facility to eliminate or reduce the quantity of waste generated. Consider the following in establishing such a program: production planning and sequencing, process or equipment modifications, raw material substitutions or elimination, housekeeping measures and loss prevention, waste segregation and separation, closed-loop recycling, and employee training and education in waste reduction.

6. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

2.7 Fueling Stations

Fueling may occur at warehouses or businesses that maintain fleets of vehicles, or at port facilities. Fuels contain organic compounds and metals that adversely affect aquatic life. The following BMPs are recommended to prevent contamination of storm water runoff that will ultimately reach surface water bodies.

1. Cover the island to prevent contact with storm water runoff. *See Figure 2.7.A.*

2. Install curbing or grade the area around the fueling island to prevent storm water from flowing onto the area and becoming contaminated.

3. Pave the fuel island with Portland cement concrete, not asphalt, because gasoline will react with the asphalt and slowly dissolve it.

The paving should be sloped on one side with a drain installed at the bottom of the slope to trap all spills from the fueling operation. The drain needs to be connected to the sanitary sewer if allowed by the local public works department, or discharged to a lined sump that will prevent spillage or leakage of spills to surface waters or groundwater. The drain also needs a control valve, such as a locked drainage valve or plug, to prevent the release of large spills into the sanitary sewer. *See Figure 2.7.A.*

If connections to sanitary sewage systems are not allowed, install an oil/water separator or an oil and grease trap to reduce the quantity of oil leaving the island with the storm water runoff. **The separators or traps will need routine inspection, cleaning, and maintenance for effective operation.**

4. Do not clean the fueling island with water and detergents. Spilled fuels, oils and grease will leave the site and contaminate surface waters if this method is used. Clean the fueling island using dry methods like spot cleaning with adsorbents or mechanical sweepers. Use a damp cloth for the pumps and a damp mop on the paved area.

5. Retain suitable cleanup materials on the site for prompt cleaning of all spills. Sorbent materials like spill pads, spill booms, or kitty litter will be effective in containing certain spills. **Do not wash any spill into the storm drain.** Dispose of the absorbent materials appropriately.

6. Post signs to educate employees. Personnel responsible for fueling vehicles should avoid overtopping fuel tanks.

7. If the fueling facility serves very large mobile equipment, such as log loaders, construct a curb or berm around the fueling area both to collect rainfall falling on the pad and prevent the run-on of storm water from the surrounding area. Follow the procedures given in Section 2.3 for loading and unloading materials.

8. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

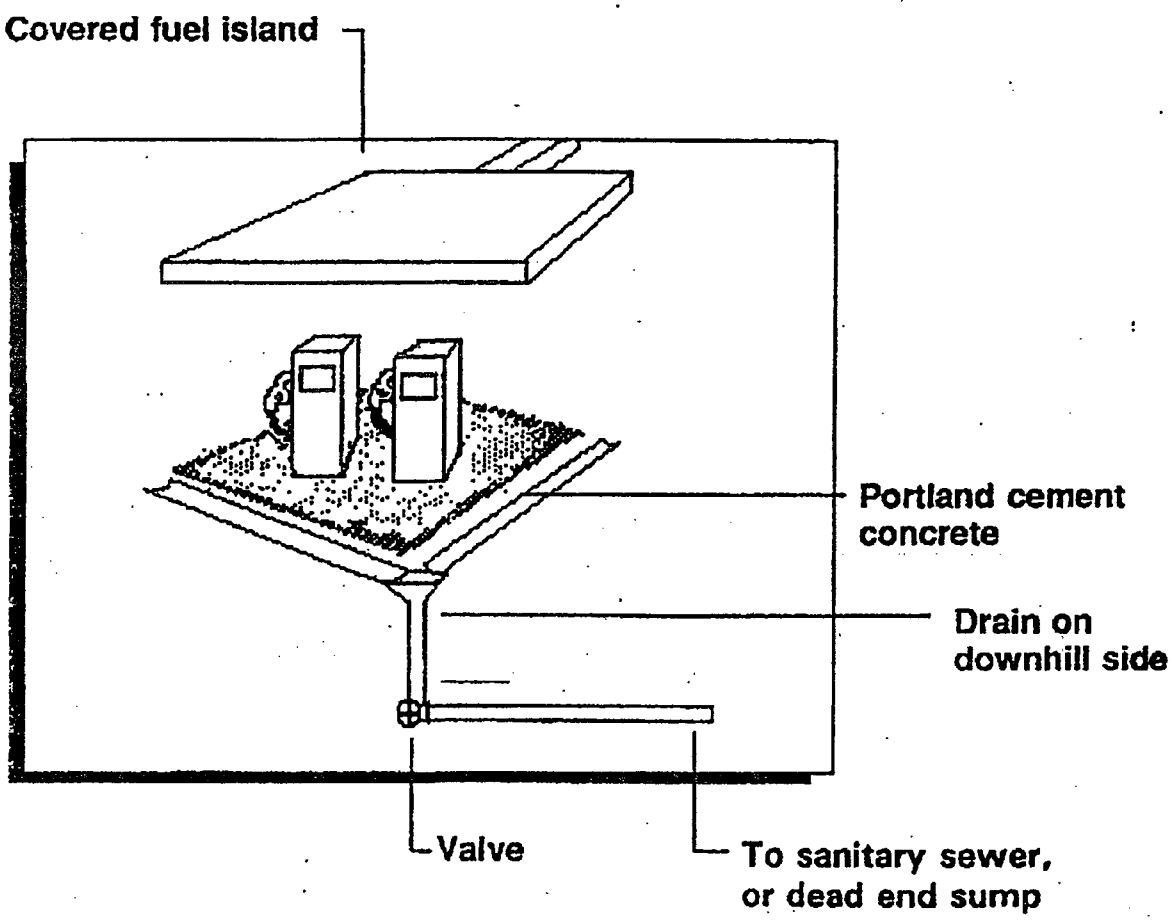


Figure 2.7.A: Covered Fuel Island
(From Washington Department of Ecology, WA, Storm Water Management Manual for the Puget Sound Basin, February 1992.)

2.8 Vehicle and Equipment Washing

Wash water from vehicle and equipment cleaning operations contains a variety of contaminants which can be harmful to aquatic life and the quality of surface water bodies. These contaminants include detergents, degreasing chemicals, oils, suspended solids, heavy metals, and organics that can cause serious pollution problems.

The disposal of wash waters from vehicle and equipment cleaning activities to the ground or to surface waters is prohibited by Oregon Administrative Rule 340-45-015 unless a permit is first obtained from the DEQ. This is a different permit from the storm water discharge permit.

Options for disposal of wash water include:

1. Installing a washing system that **recycles** all wastewater. Recycling systems remove oil and solids from the wastewater so that the water may be reused. installation may require approval or a permit from the local planning department. A full recycle system, which has no discharge, does not require a DEQ permit.

2. Discharging wastewater to **sanitary sewer**. This usually requires the permission of your local sanitary authority or public works department. Also, certain jurisdictions may require pre-treatment of the wastewater before discharge to sanitary sewer is allowed. You may also be able to connect to the sanitary system through existing floor drains if the drains are already connected to sanitary sewer. Discharging to a sanitary sewer does not require a DEQ permit.

3. Washing your vehicles at a commercial vehicle washing operation with an approved disposal system. Check to make sure that the facility you choose has an appropriate permit. Not all wash facilities dispose of their wastewater properly.

4. If none of the above options are feasible, you may be able to discharge to the storm drainage system or to the ground if you first obtain a permit from DEQ. There is a fee for this permit. Please contact the appropriate DEQ Water Quality Program in the appropriate regional office for information about the permit (see Figure 3.3.A).

2.9 Vehicle and Equipment Maintenance

Since many industrial facilities maintain vehicles and equipment, storm water can easily become contaminated with solvents, oil, grease, waste automotive fluids, acids, and caustic wastes. These substances are harmful to aquatic life, and measures should be implemented to prevent storm water contamination.

The following practices are recommended:

1. Clean vehicle and equipment parts without using solvents. This will save on disposal costs since many solvents must be disposed of as hazardous wastes. Parts can be scraped with a wire brush or placed in a bake oven for cleaning. If solvents are used, designate a centralized cleaning station to keep solvents and residues in one location. Use drip pans, drain boards, and drying racks to direct drips and spills into a fluid holding tank for reuse.

2. Use nontoxic or less toxic solvents and cleaners. Examples include using non-caustic detergents for parts cleaning and using detergent-based or water-based cleaning systems instead of organic solvent degreasers.

Replace chlorinated organic solvents, such as 1,1,1-trichloroethane or methylene chloride, with non-chlorinated solvents such as kerosene or mineral spirits. If the list of active ingredients on the solvent container includes the term "chlor," then the solvent is chlorinated.

Use cleaners that can be recycled if possible. The supplier of the cleaners and solvents along with trade journals for the industry can provide information regarding waste minimization for these activities.

3. Do not use running water from a hose to clean the work areas because the contaminated water could enter the storm drainage system and ultimately surface water bodies. Rags or spill pads can be used for cleaning small spills and a damp mop can be used for general cleaning. Contact the local public works department before discharging the mop water into the sanitary sewer. Sorbent materials including kitty litter, sawdust, spill pads and spill booms may be used for containing large spills. Dispose of clean up materials appropriately.

4. Place a drip pan underneath vehicles and equipment when performing maintenance such as removing parts, unscrewing filters, or unclipping hoses. Promptly transfer the used fluids to the proper waste or recycling drums. Open containers, including full drip pans, should not be left lying around on the site.

5. Do not pour used or leftover cleaning solutions, solvents, and automotive fluids into storm drain inlets or ditches, floor drains, sinks, or into the sanitary sewer. These substances are toxic. Floor drains, even those under cover, are frequently connected to the storm drainage system. Such drains should be plugged or, with the permission of the local sanitary authority, routed to sanitary sewer. Post signs at these potential discharge points to educate employees so that the wastes are not disposed of improperly.

Contact the distributor of leftover materials to see if unused portions can be returned. In the future purchase only the material needed, do not stockpile. Contact the DEQ Waste Reduction Assistance Program at the appropriate regional office for information about disposal and recycling options (see Figure 3.3.A).

6. Place used oil filters in funnels over the waste oil recycling or disposal collection tank to drain excess oil. Crush and recycle used oil filters if possible. Mark containers for used oil with the words "USED OIL."

7. When vehicles are driven to the site for repair, examine them for discharge of leaks. Place drip pans under the vehicles to collect fluids for recycling or proper disposal. Designate a central area on the site for draining and replacing motor oil, coolant, and other fluids. This area should be cleaned of spills and leaks daily. Contaminated storm water runoff from this area should not be allowed to drain into the storm drainage system. If allowed by the local sanitary sewer system, contaminated runoff should be drained to the sanitary sewer. It is likely that a pretreatment system such as an oil/water separator may be required prior to discharging to the sanitary sewer.

8. If damaged equipment or wrecked vehicles arrive on the site, drain and collect all engine and transmission fluids. If the equipment or vehicles were drained prior to arrival at the site, place drip pans under them immediately to contain leakage since oils and other fluids may drip for several days. Dispose or recycle all fluids appropriately.

(Note: Air conditioning systems must be emptied by certified technicians. For more information about freon recovery regulations, please contact the EPA at 1-800-296-1996.)

9. Build a shed or roof over areas used for parking equipment or vehicles that need repair or are retained for parts supply.

10. Store all cracked batteries in a non-leaking secondary container to retain acid leaks.

11. Recycle used materials such as degreasers, used oil, oil filters, antifreeze, cleaning solutions, automotive batteries, used rags, and hydraulic fluid. Separate wastes to reduce treatment costs and make recycling efforts easier. For example, keep chlorinated solvents separate from non-chlorinated solvents, separate hazardous and non-hazardous wastes, and do not mix used oil and solvents. Discuss waste separation techniques with the waste hauler or recycling company for the site.

12. Discuss pollution prevention measures with employees and seek their suggestions on waste reduction. Consider incentives for employees, such as a reward program, to promote pollution prevention.

13. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

2.10 Sandblasting and Painting Operations

Sandblasting and painting operations use materials and produce waste that are potentially harmful to both human health and the environment. Overspray of paints, blasting without adequate containment, and uncovered grit piles may contribute to serious water pollution from toxic metals and highly toxic materials from antifouling paints. This pollution can lead to irreversible and lethal effects for many aquatic organisms. Dumping of paints, solvents, adhesives, oils, detergents, grit material, etc., not only damages the environment, but it is illegal and a violation of the federal Clean Water Act and Oregon Administrative Rule. If materials classified as hazardous wastes are discharged, the dumping also violates hazardous waste regulations.

Generators of blast waste are required to characterize, handle and dispose of such waste according to state and federal regulations. This means that generators are responsible for determining if their waste is hazardous. For assistance in determining if a waste is hazardous, contact the Waste Reduction Assistance Program in the appropriate DEQ regional office (see Figure 3.3.A).

Of particular concern is paint, grit or wastewater containing antifouling ingredients, such as tributyl tin (TBT) or cuprous oxide, which require special handling because of their impact to the environment. Recent studies indicate that even the abrasive material, before blasting, can be harmful to marine life. The following guidelines are general recommendations for blasting and painting operations. However, specific guidelines to be followed for management of paint or grit waste, with or without antifouling ingredients, are identified in *Best Pollution Prevention Practices for Sandblasting and Painting*. For copies of this document, please contact the appropriate DEQ regional office (see *Figure 3.3.A*).. The following are best management practices for sandblasting and painting:

1. Prevent paint chips, abrasive blast material (before blasting), and grit waste from coming in contact with storm water runoff and surface water bodies. Outdoor blasting and painting should be done in designated areas that provide adequate protection to prevent overspray and fugitive emissions to insure compliance with the state and federal air quality regulations.

2. Operate all designated sites for blasting and painting operations with containment doors and ventilation filtration equipment in good working order.

3. When operating outside permanent blasting facilities, use portable containment such as tarps, shrouds, or portable containment structures to minimize airborne fugitive emissions.

4. Give special attention to existing wind and weather conditions in order to further minimize the impact of airborne emissions. Do not operate in windy conditions.

5. Provide a thorough cleaning of spent paint, paint chips, protective coatings, grit waste, etc., to prevent the discharge of these wastes into state waters.

6. Segregate wastes whenever possible to reduce treatment, disposal, and management costs. It is particularly important to separate nonhazardous wastes from hazardous wastes because of different regulatory requirements, and different treatment and disposal costs. Dispose of wastes appropriately.

7. Recycle solvents and any other materials where recycling opportunities exist.

8. Maintain an Emergency Spill Response and Cleanup Plan (see Section 2.4).

2.11 Inspection and Monitoring Activities

Inspecting and monitoring the equipment used in industrial processes can be important in preventing problems that can lead to leaks or spills of potential contaminants for storm water runoff. These activities are also needed for proper maintenance of storm water facilities on the site. Without adequate maintenance, sediment and other debris can quickly clog storm water facilities and make them useless.

2.11.1 *Maintenance Practices for Equipment and Process Areas*

A. Perform frequent inspections for structural integrity of items such as piping, valves, controls, joints, welds, tanks, drums, roofs, pavement, or other sources of potential leaks and spills on the site that can contaminate runoff. These may be visual inspections or some form of nondestructive testing method, such as hydrostatic pressure or acoustic emission tests.

B. Consider the installation of monitoring systems for areas on the site where overflows, spills, and catastrophic leaks are possible. Train staff in the use of the monitoring equipment for proper operation.

C. Ensure that staff are present during material transfers both to prevent spills if possible and to clean up spills immediately. The personnel should be properly trained in spill containment methods including the use of sorbent materials, gelling agents and vacuum and pump systems.

D. Post signs and labels at areas where information is needed to prevent contaminants from being released to storm water discharges, such as material transfer, loading and unloading, or equipment areas. The names and phone numbers of both facility and regulatory staff should be posted with phone numbers for contact in case of an accidental discharge or fire.

2.11.2 *Maintenance Practices for Storm Water Facilities*

A. Inspect catch basins, drainage pipes, spillways, control valves and plugs, and related drainage structures at least annually to determine if maintenance is needed. It may be useful to inspect the storm sewer outfalls during a significant rainfall or snow melt event to determine how well the system is working.

B. Immediately repair any deterioration threatening the structural integrity of the facilities. Such repairs may include: replacing catch basin lids or control valves, removing rock and debris from spillways, clearing clogged pipes or drainage inlets, or removing excessive growth from drainage ditches for proper operation.

C. Sweep paved areas and remove debris as frequently as needed and, if possible, before a rainfall event to prevent clogging of drainage structures.

D. Post warning signs adjacent to all storm drain inlets to convey messages such as "Dump No Waste - Drains to Groundwater," "Streams," "Lakes," "Ocean," etc.

2.12 Dust Control

Dust controls may be needed on industrial sites for various reasons, including land disturbance, demolition, and material handling areas. If effective, dust controls can prevent pollutants from contaminating storm water runoff by reducing the surface and air transport of dust caused by these activities.

2.12.1 *Practices to Control Dust from Land Disturbance and Demolition Activities*

A. Use temporary controls such as palliatives, or chemical soil treatments, that are applied as spray-on adhesives. Common palliatives include calcium chloride, anionic asphalt emulsion, latex emulsion, and resin-water emulsions. Since certain chemicals may be inappropriate for some soil types or application areas, the permittee should check with the local government prior to application of the chemical treatments. Vehicles should not be driven over the treated area to prevent the tracking of the chemicals to other areas on or off the site.

In addition, irrigation is a temporary measure involving a light application of water to moisten the soil surface. The correct amount of water should be applied because an excess of water can cause erosion.

B. Minimize soil exposure by temporary or permanent soil stabilization controls, such as mulching, seeding, applying topsoil, spreading coarse gravel or crushed stone, or planting trees. If existing vegetation on the site can be maintained, this will help in controlling dust.

C. Install temporary or permanent wind breaks or barriers that reduce airborne particles by slowing wind velocities and causing the particles to drop. Large trees and shrubs left in place can provide wind barriers, while temporary measures include solid board fences, tarp curtains, sediment walls, crate walls, and bales of hay.

D. In arid regions, use tillage or deep plowing of soil to provide dust control. Large clumps of soil are deposited on top of the dust particles, preventing their movement by wind or water.

E. Inspect the sites requiring dust controls frequently and reapply materials or controls as needed.

2.12.2 *Practices to Control Dust from Material Handling, Process and Transfer Areas*

A. Install dust collection systems, such as negative pressure systems (vacuum systems), or collector systems (bag and cyclone), or filter systems.

B. Use water spraying and collect the dust-contaminated waters for treatment.

C. Use street sweepers to collect dusts. The vacuum type are more efficient and are most effective on dry areas. Brush sweepers can also be used.

D. Train employees in the proper operation of the equipment according to the manufacturers' recommendations and inspect the equipment regularly.

2.13 Erosion and Sediment Control

This section is intended for those industrial facilities which may have areas of landscaping or exposed soils that are subject to the erosive action of wind or water. It is not intended to be used as guidance for large scale construction projects.

Erosion is the process by which soil particles are loosened and displaced by the action of water or wind on the soil surface. The loosened particles are called sediment, and the deposition of this material in streams is called sedimentation. Sedimentation and turbidity associated with sediment laden flows degrade water quality. Turbidity in water interferes with photosynthesis and sediment silts in fish spawning beds and clogs the gill passages of fish.

Over time, erosion control is more effective than sediment control in preventing water quality problems. Erosion control is less subject to failure due to high flows, requires less maintenance, and is also less costly. In some cases a combination of erosion control and sediment control may be required. The following best management practices can be used for areas on industrial sites with exposed soil due to steep slopes, soil stockpiles, heavy equipment traffic, or minor construction projects. Regular inspection and prompt maintenance are critical to the success of all the practices in this section. The selection of an appropriate measure will depend on the degree of slope on the site, sensitivity of the area to the intended use, stream or wetland features in the area, and type of soil encountered.

Please note that construction activities, including clearing, grading and excavation, which disturb five (5) or more acres require NPDES general storm water permits. The five acre limit is currently being reviewed by EPA and may be lowered. Please contact the DEQ for further information. See Figure 3.3.A.

2.13.1 *Erosion Control Practices*

The following are recommended erosion control practices:

A. ***The preservation of existing vegetation on the site.*** Preserving the existing vegetation is frequently the best preventative measure for erosion. Because native or existing vegetation is already established, it is usually a better cover species than introduced species. Where possible, establish "do not disturb" zones on your site. *See Figure 2.1.A.*

B. ***The implementation of vegetative and soil protection practices for soils that are already exposed.*** These practices reduce erosion potential in several ways. They shield the soil from the direct impact of rainfall or runoff, increase soil porosity and water storage capacity of the soil, reduce the energy of the runoff, and physically hold the soil in place with the root system of the vegetation. Vegetative erosion controls include:

   i) The establishment of ***vegetative cover***, either as a permanent cover or as a temporary measure prior to permanently stabilizing the area. Vegetative buffers or complete coverage can provide a significant reduction of erosion potential. This can be accomplished by seeding, seeding and mulching, seeding and matting, or sodding. Maintenance may be required to successfully vegetate an area. This practice is not suited for areas which carry heavy traffic.

   ii) The use of ***mulching or erosion control mats or netting*** to physically protect exposed soils. This is a

short term measure designed to provide immediate protection until a more permanent stabilization measure can be implemented. Heavy traffic areas are not well suited to this type of protection. This option requires close attention to installation procedures, and may be expensive in large scale applications. It can be very effective, however, if an appropriate medium is selected for a given site. *See Figure 2.13.B.*

C. ***The installation of structural controls to reduce the energy of the water flowing across soils, or to divert flows from exposed areas.*** Reducing the energy of runoff streams is beneficial in that slower flows do not act as strongly in eroding the soils, and they do not carry as much sediment from the site. These controls are not generally successful as stand alone measures, but may enhance the effectiveness of other erosion reduction measures. Structural erosion control measures include the following:

i) The use of ***level spreaders or interceptor dikes and swales*** for long, exposed slopes or at the tops of shorter slopes. The velocity of the runoff can be reduced, and flows diverted from exposed areas by utilizing this type of structural control. Proper installation and use of outlet protection are critical to the success of this type of control. Choice of measure and spacing depend on the degree and length of the slope being addressed. *See Figure 2.13.C.*

ii) The use of ***pipe slope drains*** to remove excess water or divert runoff from slopes or saturated soil areas, reducing the potential for erosion. The inlets and outlets should be properly designed for adequate stabilization. The outlet area is particularly important, as the higher velocity water at the end of pipe can be an extremely erosive force. Outlet design and correct installation are the keys to the success of this type of control.

iii) The installation of ***outlet protection*** at all pipe, ditch or channel discharge points to help prevent scouring in the receiving stream or discharge area. Proper installation of stone, riprap, aprons or detention basins will allow the energy of the discharge to dissipate without eroding the surrounding soils. *See Figure 2.13.D.*

iv) The use of ***check dams*** to reduce scouring and gullying in small channels. Dams can be built from stone, logs, etc., and can be temporary measures or permanent installations. Dams should be spaced so that the top of the downstream dam is at the same elevation as the toe of the upstream dam. It is important that the center section of the dam be lower than edges. If the edges are lower or at the same elevation as the center the chance for washouts at the ends increases dramatically.

These structures also tend to act as sediment control structures, so it is important that they be inspected and maintained regularly to insure adequate performance. Excessive sediment build-ups must be removed in order for the dam to be most effective.

v) ***Stream bank stabilization*** to control erosion from the areas along streams where vegetative practices are not feasible. Riprap, gabions, reinforced concrete structures such as bulkheads or retaining walls, or other measures should be designed by a licensed professional engineer to insure adequacy and effectiveness.

vi) ***Paving or graveling of roadways and driveways*** to help reduce soil disturbance.

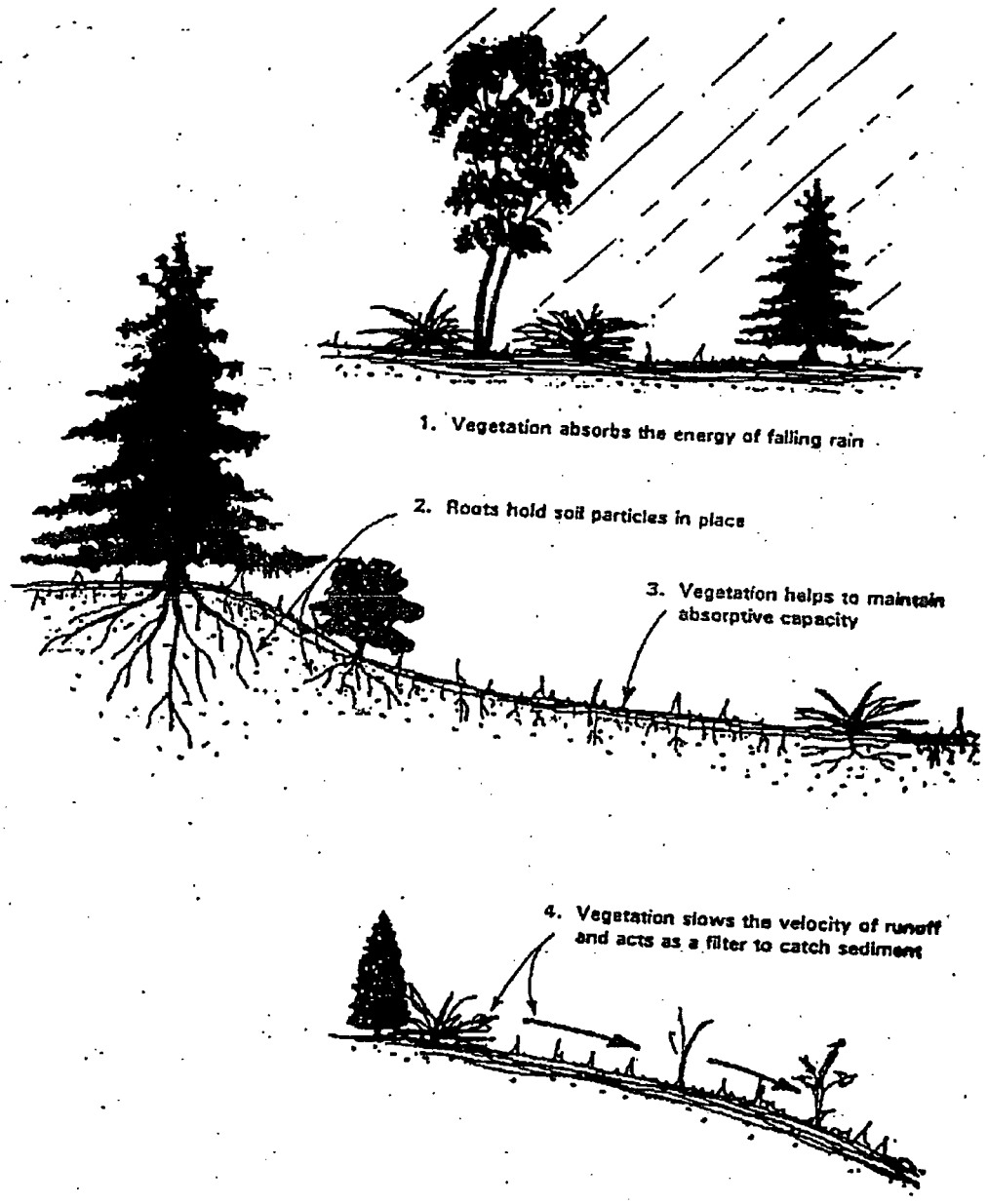


Figure 2.13.A: Effect of Vegetation on Storm Water Runoff
(From Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February 1992.)

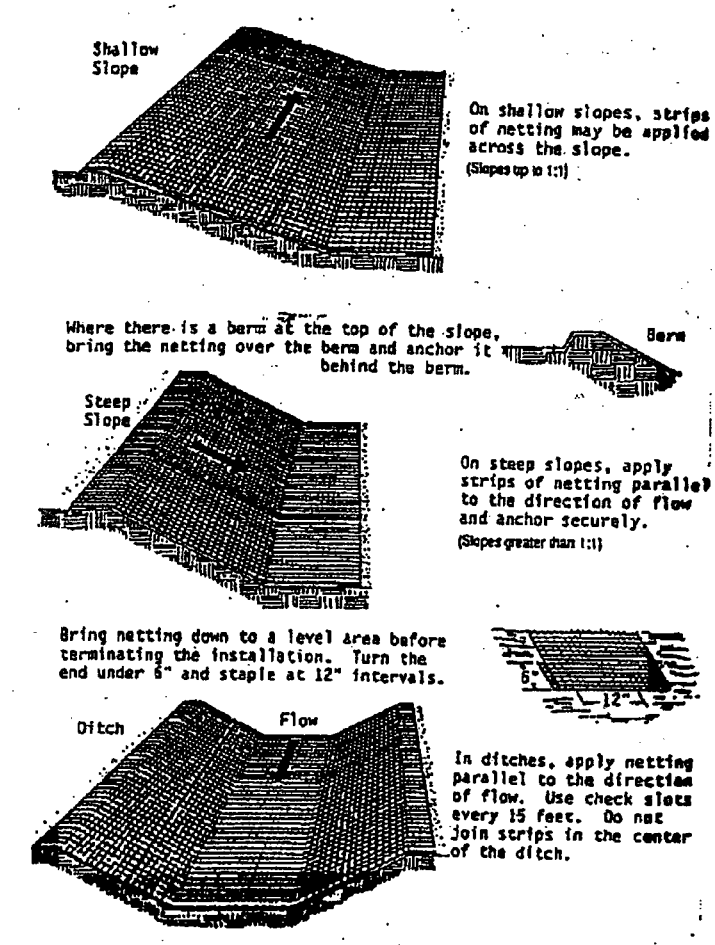


Figure 2.13.B: Orientation of Netting and Matting
(From Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February 1992.)

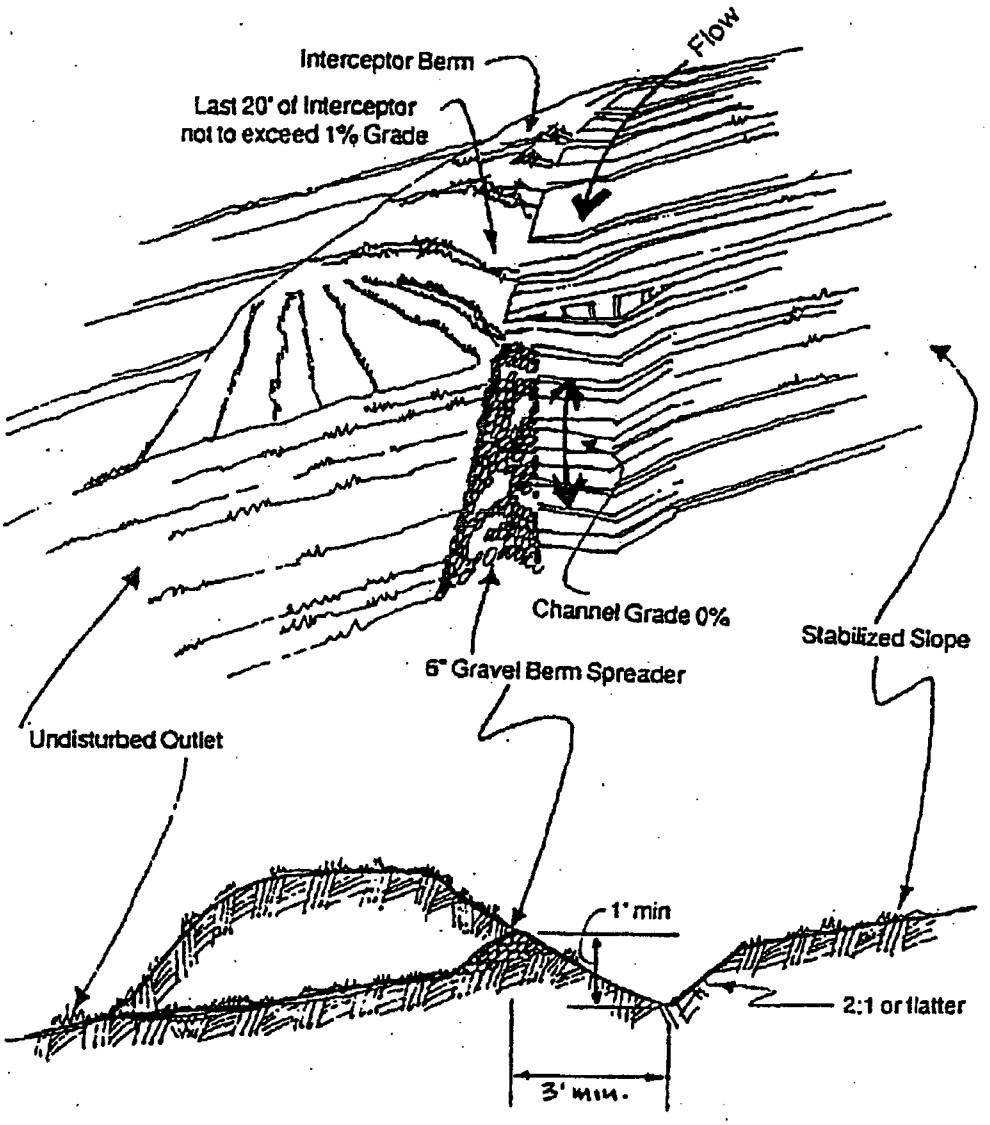


Figure 2.13.C: Level Spreader
(From Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February 1992.)

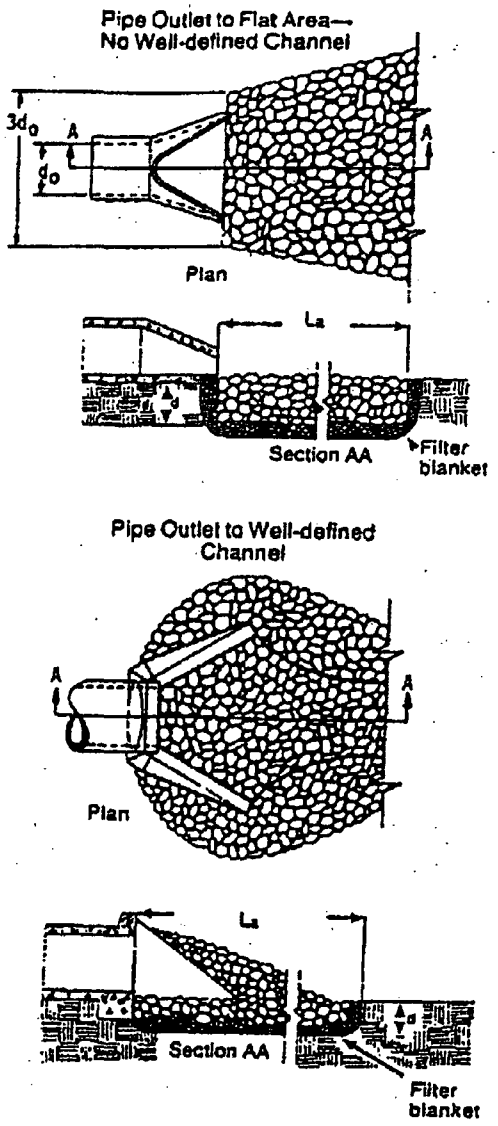


Figure 2.13.D: Rock Outlet Protection
(Modified from U.S. Environmental Protection Agency, Storm Water Management for Industrial Activities, September 1992)

2.13.2 *Sediment Control Practices*

The following are recommended sediment control practices:

A. ***The use of vegetation to retard the velocity of sediment laden flows.*** Using vegetated swales or vegetated buffer strips to intercept runoff helps reduce the energy of the stream, allowing sediment to settle out and be captured by the vegetation.

B. ***The installation of structural controls to trap sediment, reduce stream energy, and allow for settling of turbid waters.*** Structural controls include measures designed to physically trap sediment or allow sediment to settle out of runoff. Specific measures include the following.

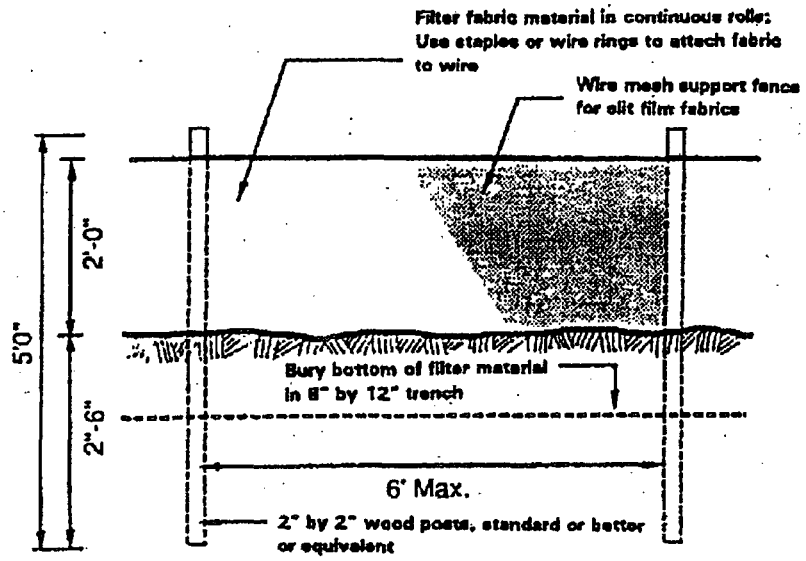
i) ***Filter fabric silt fences*** are effective short term controls for trapping sediment and filtering sediment laden flows. However, they must be properly installed and maintained. Prompt maintenance and repair can extend the life span of fences until erosion control measures have been established. *See Figure 2.13.E.*

ii) ***Detention basins or settling basins*** can be used in conjunction with outlet protection, ditching and other measures to provide a way to slow down the velocity of a stream and allow the sediments to settle out of turbid flows. An appropriately designed outlet that filters the basin effluent is a very effective way to enhance the performance of such controls.

iii) ***Check dams***, mentioned in the erosion control section, can be used to reduce channel velocities and capture sediment as it settles out. These must be designed and built with care to insure that the structure will enhance the erosion and sediment control and not create additional problems.

iv) ***Constructing paved or rocked roads or entrances*** can reduce the amount of mud and sediment that is tracked onto areas where the material could be washed into the storm drainage system. *See Figure 2.13.F.*

Additional information or installation details can be found in a variety of documents. Please see Section 3.1 for more information.



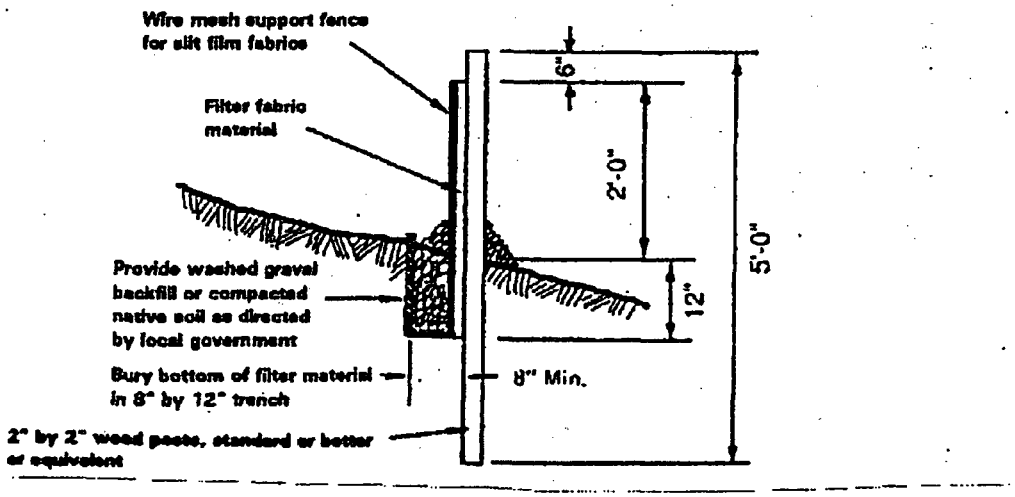


Figure 2.13.E: Filter Fabric Silt Fence
(From Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February 1992.)

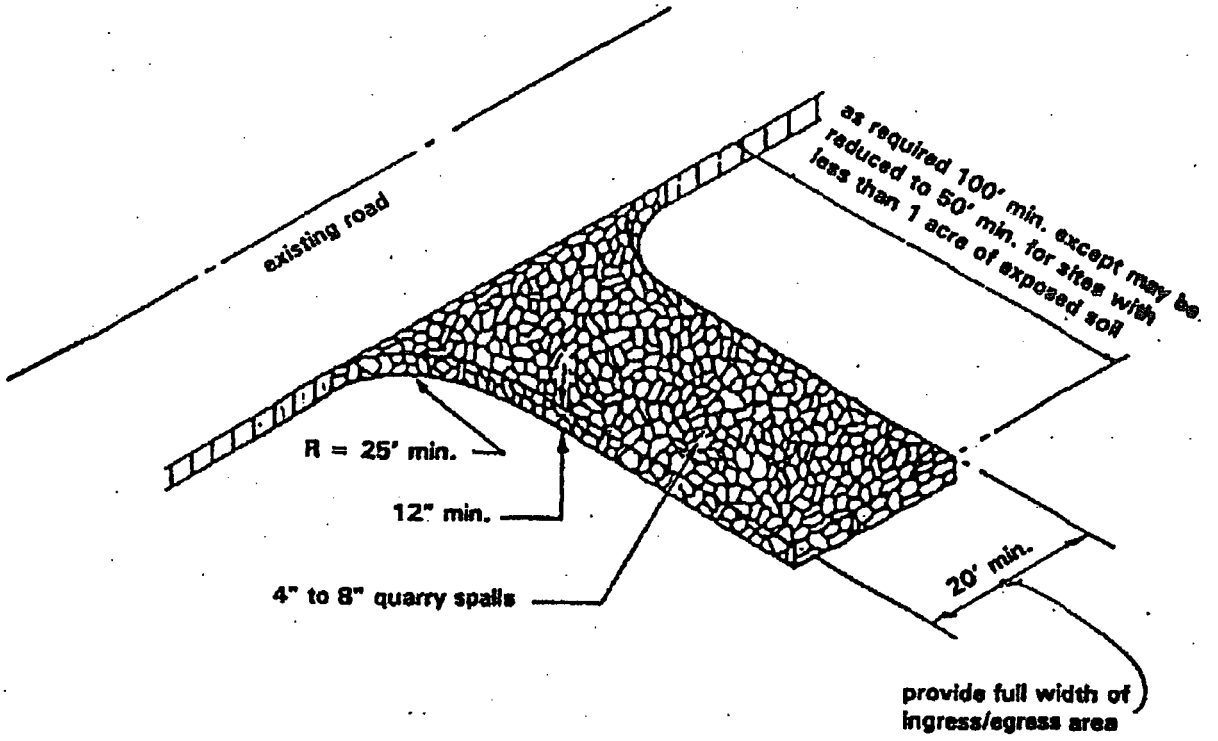


Figure 2.13.F: Stabilized Construction Entrance
(From Washington Department of Ecology, WA, Stormwater Management Manual for the Puget Sound Basin, February 1992.)

3 ADDITIONAL RESOURCES

3.1 Document List

- Code of Federal Regulations (CFR), Title 40-Protection of Environment, Parts 122, 123, 124, and Title 33, Parts 153, 154, and 155. * *Sections of rule available from*

- Erosion/Sedimentation Control Plan Technical Guidance Handbook, Clackamas County, OR, August 1994. * *Available from Clackamas County (503) 650-3737*

- Guidance Document for Preparation of the NPDES Storm Water Pollution Control Plan, Oregon Department of Environmental Quality, August 1997.

- Nonpoint Source Pollution Control Guidebook for Local Government, Oregon Department of Environmental Quality & Oregon Department of Land Conservation and Development, June 1994.

- Stormwater Quality Facilities, A Design Guidance Manual, City of Portland, Bureau of Environmental Services (BES), March, 1995.

* *Available from City of Portland (503) 823-5600.*

- Stormwater Management Manual, City of Portland, Bureau of Environmental Services (BES), expected to be available in 1998. * *Available from City of Portland (503) 823-5600.*

- Stormwater Program Guidance Manual for the Puget Sound Basin, Volumes 1 & 2, Publication #92-32 and #92-33, Washington Department of Ecology, WA, July 1992. * *Available for fee from WA DOE (206) 438-7528.*

- Stormwater Management Manual for the Puget Sound Basin (The Technical Manual), Publication #91-75, Washington Department of Ecology, WA, February 1992. * *Available for fee from WA DOE (206) 438-7528.*

- Storm Water Management for Industrial Activities, U.S. Environmental Protection Agency (EPA), April 1992.

* *Available for fee from Education Resource Information Center/Clearinghouse (614) 292-6717, order #447N.*

- Storm Water Management for Construction Activities, EPA, April 1992.

* *Available for fee from Education Resource Information Center/Clearinghouse (614) 292-6717, order #482N.*

- Water Quality Best Management Practices Manual for Commercial and Industrial Businesses, City of Seattle, WA, June 1989.

* *Available for fee from WA DOE (206) 438-7528.*

3.2 Department Of Environmental Quality (DEQ) Contacts

Please see the attached map for the address and phone number for the regional office serving your county.

3.3 Other Agencies

- **Environmental Protection Agency (EPA):**

Chlorofluorocarbons (CFC) Removal and Recycling Information 1-800-296-1996
Oregon Operations Office (503) 326-3250
Region 10 Storm Water Program (206) 553-8399
Spill Prevention Countermeasure and Control 1-800-424-4EPA

- **Clackamas County, Oregon**

Department of Utilities, (503) 650-3737

- **City of Eugene, Oregon**

Water Resources Team, (541) 682-2663

- **City of Portland, Oregon**

Bureau of Environmental Services, Industrial Stormwater Section, (503) 823-5600

- **City of Salem, Oregon**

Environmental Services, (503) 588-6228

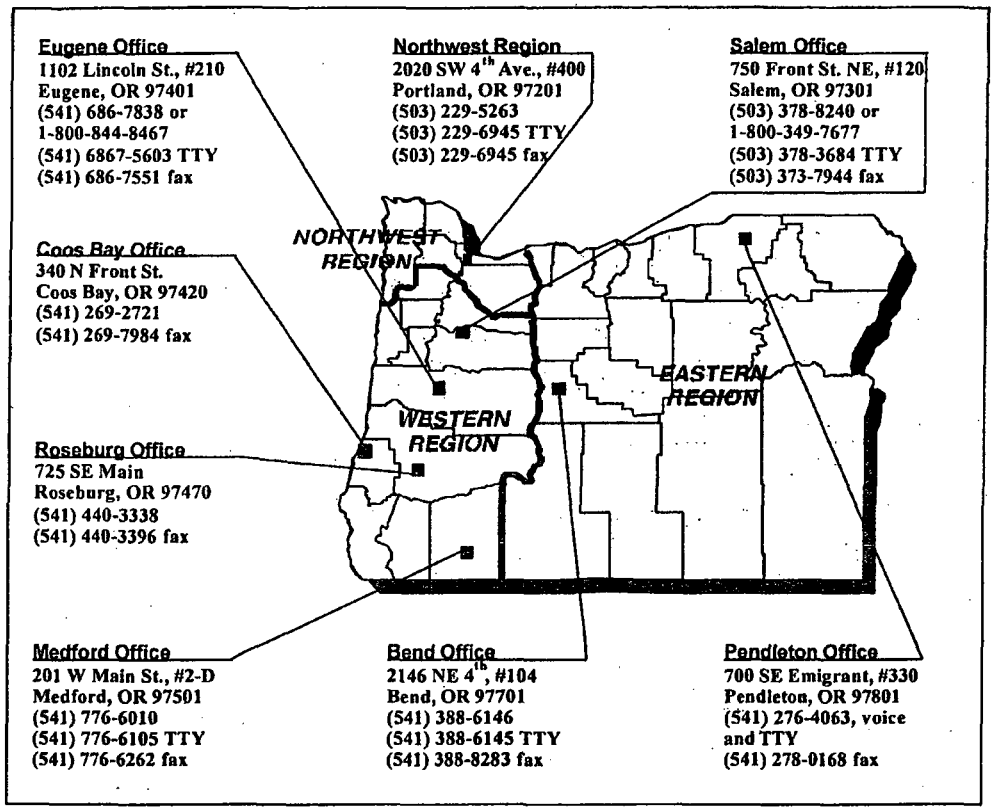
- **Unified Sewerage Agency of Washington County (USA), Oregon**

Source Control Section, (503) 844-8931

- **Washington Department of Ecology (WA DOE):**

Industrial Storm Water Program (206) 438-7614
Municipal Storm Water Program (206) 438-7076

Figure 3.3.A: DEQ Locations



Schnitzer Investment Corp.
Burgard Industrial Park
Portland, Oregon

Stormwater Management Plan

Appendix E
Spill Response Contact Sheet

December 2005

FOR EMERGENCY SPILL RESPONSE CALL:

Schnitzer Investment Corp.

Jim Jakubiak

Work: (503) 286-6976

Mobile: (b) (6)

Home: (

Schnitzer Northwest, LLC

Lynda Collie, Property Manager

Work: (360) 906-7004